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Quick-Look Guide to the Crustal Dynamics Project's Data Information System

Carey E. Noll, Jeanne M. Behnke,
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National Aeronautics
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**Scientific and Technical
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ASCII	American Standard Code for Information Interchange
BE-C	Beacon Explorer C
BFEC	Bendix Field Engineering Corporation
BIH	Bureau International de l`Heure (Paris, France)
BPI	Bits Per Inch
BPS	Bits Per Second
CDP	Crustal Dynamics Project
CERGA	Centre d'Etudes et de Recherches Geodynamics et Astronomiques (France)
CFA	Center for Astrophysics (Harvard/Smithsonian)
CSR	Center for Space Research (University of Texas)
DBH	VLBI Data Base Handler
DBMS	Data Base Management System
DEC	Digital Equipment Corporation
DGFI	Deutsches Geodatisches Forschungsinstitut (Munich, West Germany)
DIS	Data Information System
DOS	Disk Operating System
DSN	Deep Space Network
EBCDIC	Extended BCD Interchange Code
EGP	Experimental Geodetic Payload (AJISAI)
EGS	Experimental Geodetic Satellite (AJISAI)
EOF	End-of-file
ESA	European Space Agency
GAOUA	Main Astronomical Observatory of the Ukrainian Academy of Sciences
Geodyn	Geodynamics Program
GEOS	Geodetic Earth Orbiting Satellite
GMT	Greenwich Mean Time
GPS	Global Positioning System
GRGS	Groupe de Recherches de Geodesie Spatiale (Toulouse, Grasse, Paris, France)
GSFC	Goddard Space Flight Center
GTE	General Telephone and Electronics Corporation
HO	Haystack Observatory
HOLLAS	Haleakala Laser Station
HP	Hewlett Packard
IAG	International Association of Geodesy
IAU	International Astronomical Union
IBM	International Business Machines
ID	Identification
IPMS	International Polar Motion Service (Mizusawa, Japan)
IRIS	International Radio Interferometric Surveying

JPL	Jet Propulsion Laboratory
LAGEOS	Laser Geodynamics Satellite
LLR	Lunar Laser Ranging
LSG	Laser Support Group
MERIT	Monitoring of Earth Rotation and Intercomparison of Techniques (observation and analysis)
MIT	Massachusetts Institute of Technology
MLRS	McDonald Laser Ranging System
Moblas	Mobile laser ranging station
MTLRS	Modular Transportable Laser Ranging System
MV	Mobile VLBI
NAL	National Aerospace Laboratory (Tokyo, Japan)
NASA	National Aeronautics and Space Administration
NCF	NSSDC Computing Facility
NGS	National Geodetic Survey
NOAA	National Oceanic and Atmospheric Administration
NPSS	NASA Packet Switching System
NRAO	National Radio Astronomy Observatory
NSSDC	National Space Science Data Center
OVRO	Owens Valley Radio Observatory
Polaris	Polar motion analysis by radio interferometric surveying
PSCN	Program Support Communications Network
SAO	Smithsonian Astrophysical Observatory
SESnet	Space and Earth Science network
SHA	Shanghai Observatory (Shanghai, China)
SLR	Satellite Laser Ranging
SPAN	Space Physics Analysis Network
SQL	Structured Query Language
TLRS	Transportable laser ranging system
TM	Technical Memorandum
UFI	User Friendly Interface
UPAD	University of Padua (Padua, Italy)
USGS	United States Geological Survey
USNO	United States Naval Observatory
UT	Universal Time
VLBI	Very Long Baseline Interferometry
ZIPE	Zentral Institut fur Physic der Erde (Potsdam, GDR)

1. Introduction

The Crustal Dynamics Project was formed by NASA to apply space methods and technology to advance the scientific understanding of Earth dynamics, tectonophysics, and earthquake mechanisms. As part of its data management, the Project has designed and implemented a centralized Data Information System (DIS). The DIS has been fully operational since September, 1982. The main purpose of the DIS is to store all geodetic data products acquired by the Project in a central data bank and to maintain information about the archival of all project related data. All authorized Project investigators and staff have access to the DIS by means of a dial-up telephone line and an alphanumeric terminal connected to a 300-, 1200-, or 2400-baud modulator demodulator (modem). In addition, the DIS is accessible through the Space Physics Analysis Network (SPAN) and GTE TELENET facilities. A functional diagram of the DIS is presented in Figure 1-1.

The archive of pre-processed laser and correlated, preprocessed VLBI data are retained off-line in the DIS tape library. All other information can be accessed through a data base utilizing the ORACLE data base management system (DBMS). The laser and VLBI data sets accessible through the DIS fall into four major categories:

a. Pre-processed data. Catalogues of pre-processed SLR (Satellite Laser Ranging) from 1976 through 1986 and VLBI data from 1976 through 1985. Summaries of SLR data from LAGEOS, BE-C, and and STARLETTE satellites are stored on-line in a data base; the actual data are archived off-line on magnetic tape. The VLBI data consists of on-line experiment listings in the data base and a magnetic tape archive of the actual experiment data.

b. Analyzed data. SLR, LLR (Lunar Laser Ranging), and VLBI analyzed results supplied by the Project's Science Support Groups and other analysis centers and Project investigators at GSFC, JPL, NGS, MIT, the University of Texas, and many other global institutions. These analyzed results currently span different periods through the 1976-1985 time frame and are accessible through a data base management system. They include precision baseline distances, earth rotation and polar motion determinations, length-of-day values, and calculated station positions.

c. Ancillary data. This information includes descriptions of Crustal Dynamics Project site locations, a priori monument coordinates and calibration data, and a priori star coordinates. These data sets are contained in the on-line data base.

d. Project management information. This category is accessible through the DIS data base to authorized Project personnel only and includes mobile system schedules, occupation information, and configuration control information. In addition, DIS operational information is also kept in the data base and are accessible to DIS staff only. They include logs of all laser and VLBI tapes received from the many global sources as well as logs of all tapes created by the DIS for outside users. Listings of DIS back-up tapes are also retained.

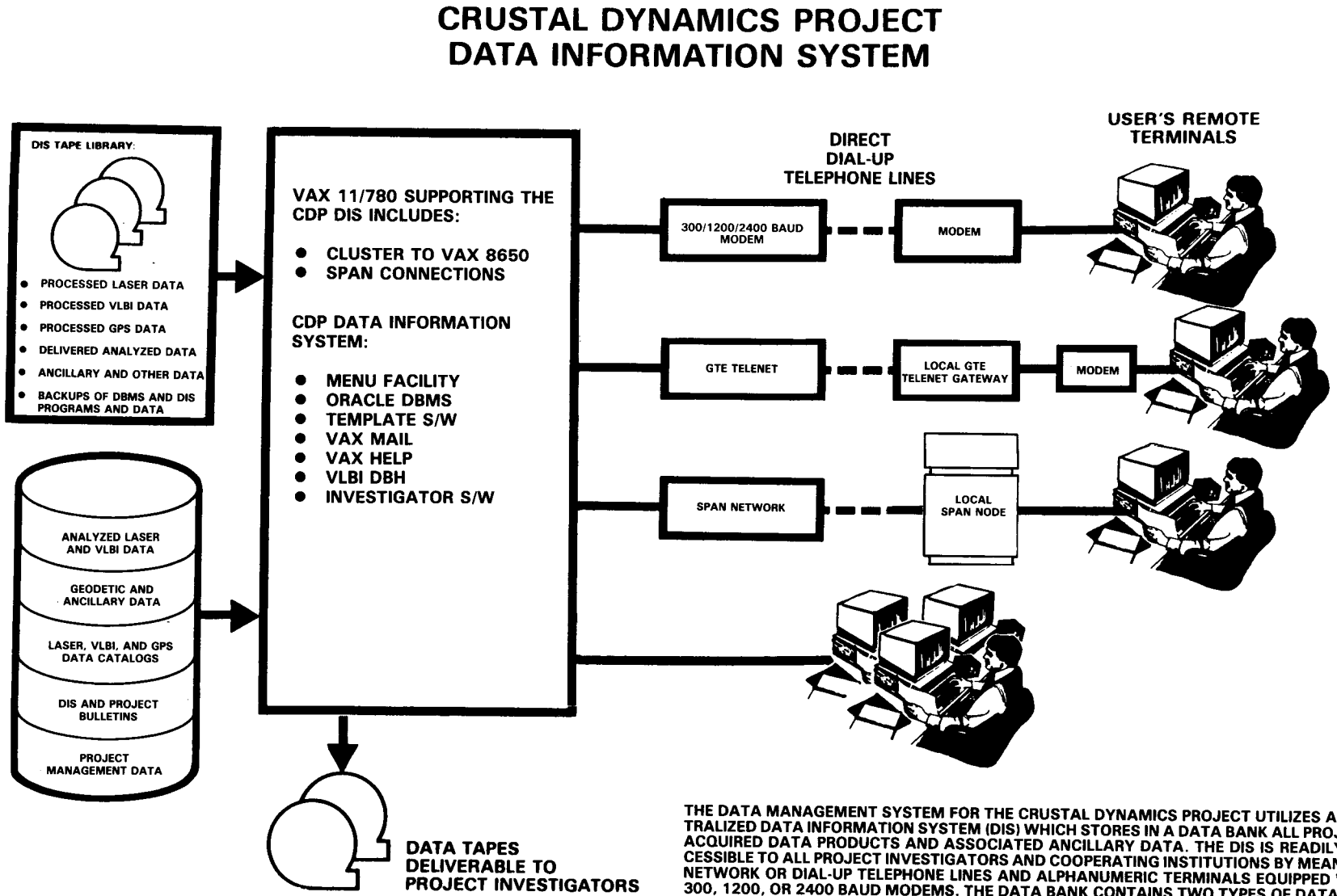

Figure 1-1. Functional Diagram of the DIS

The menu-driven system provides the user with access to the different parts of the DIS, and data retrievals or queries are possible with user friendly interfaces. The main menu of the DIS is shown in Figure 1-2.

Each menu or sub-menu selection will lead to a small prologue about the selection. The nine main menu items is listed below with its corresponding function:

HELP -- aids the user in the available menu items and presents information relative to the generation of the analyzed results stored in the DIS.

SQL -- displays sub-menus of pre-programmed queries which allow the user to directly access the various acquired data sets through ORACLE's SQL query language.

DBH -- executes the VLBI Data Base Handler, developed by the VLBI Science Support Team at GSFC, to provide the user with information about VLBI experiment sessions and to allow the user to browse the processed VLBI data.

BULLETIN -- displays current and previous Crustal Dynamics Project and DIS bulletins on an article-by-article basis.

NEWS -- informs the user of Project-related information such as future Project meetings, etc.

DATA EXCHANGE -- provides access to several analysis programs received from Project investigators.

REPORTS -- displays sub-menus which summarize and present selected data base tables such as Project occupation schedules, data catalogues, etc.

SCREEN FORMS -- displays a sub-menu of screen forms which allow the user to access the tables of the ORACLE data base without the use of a formal query language. Data can be retrieved and displayed in these pre-designed formats.

EXIT -- exits user from the DIS and terminates the connection to the NCF.

Section 2 of the document presents information on how users may access the DIS; Section 3 describes each of the DIS menu items in greater detail; Section 4 details how users may request information from the DIS staff; Section 5 presents future plans for the DIS; and Section 6 is a bibliography of related documents. Examples of the various types of information accessible to users of the DIS are given throughout this document.

```
**********************************************************************************

                                D I S  M E N U

          1 -- Guidance and Help functions for the DIS

          2 -- Interactive Data Base Management System

          3 -- VLBI Data Base Handler

          4 -- Crustal Dynamics Project Bulletin

          5 -- DIS News

          6 -- Investigator Data Exchange

          7 -- Reports Menu

          8 -- Screen Form Query Menu

          9 -- Exit from the DIS

DIS>Please enter your Main Menu selection:
```

Figure 1-2. DIS Main Menu

2. Getting Access to the DIS

2.1 User ID

All authorized Crustal Dynamics Project investigators or staff members are entitled access to the DIS. A potential user of the DIS must first obtain a set of two user IDs: a computer username and password (this ID is the same for all DIS users), and a second, user-specific identification phrase. Authorized Crustal Dynamics Project investigators or staff members who have not received these IDs should contact Henry Linder, Carey Noll, or Jeanne Behnke at the address given in Section 2.5 of this document.

2.2 Terminal Setup

Once the necessary identification codes have been obtained, the user should set the terminal to the correct mode for access to the DIS. The user should set the terminal to full duplex, eight bits, no parity, and one stop bit. For dial-up connection, the modem may be set to 300, 1200, or 2400 baud; the DIS computer will switch accordingly. The telephone numbers of the computer are provided in Section 2.3.1. In order to access all features available through the DIS it is recommended that a VT100 terminal or emulator is used. These capabilities basically include screen definitions such as reverse video and full-screen editing. If a personal computer is used to access the DIS, several packages provide adequate terminal emulation. These communication programs include: CrossTALK(TM), VTERM(TM), and PC-PLOT-III(TM) for "full" VT100 terminal capabilities, and SmartCOM(TM) for some VT100 capabilities. A summary of control characters which can be used while accessing the DIS is shown in Table 2-1.

2.3 Remote Access

The DIS can be accessed through conventional dial-in methods, the world-wide TELENET system and the SPAN and SESnet computer networks. The new networking feature will provide a greater range of access to the DIS for the geodynamics community.

2.3.1 Dial-In Access

The dial-in features have been augmented since the last issue of the DIS User's Guide. There are now two dial-in services for users, regular access through the GTE TELENET access and the GSFC number.

2.3.2.1 GTE TELENET Access

The TELENET access to the NSSDC VAX has been made possible by the institutional support of the National Space Science Data Center (NSSDC). Several of the local area access numbers in major U.S. cities for TELENET are listed in Table 2-2. When calling from an area that is not listed in the table, users can dial the TELENET service center (1-800-TELENET) for local area dataline numbers. To access the DIS/NSSDC VAX computer, the user should follow these steps:

Table 2-1

Summary of Control Characters

Function	Keystroke(s)
Interrupt command on program execution and return user to DIS Main Menu Terminate execution or display of records of SQL query	<CTRL><C>
Restart terminal output that was suspended by a <CTRL><S>	<CTRL><Q>
Suspend terminal output until <CTRL><Q> is entered	<CTRL><S>
Show time and process information	<CTRL><T>
Discard the current input line	<CTRL><U>
Interrupt command or program execution and return user to DIS Main Menu	<CTRL><Y>
Exit ORACLE data base management system (UFI> prompt) and return to DIS Main Menu Exit screen display and return to Screen Form Sub-Menu	<CTRL><Z>

Table 2-2

Local Area Access Numbers for TELENET

State	Area Code	City	300 BPS	1200 BPS
AL	205	HUNTSVILLE	539-2281	539-2281
AK	907	ANCHORAGE	258-7222	258-7222
AZ	602	PHOENIX	254-0244	254-0244
CA	213	LOS ANGELES	624-2251	624-2251
CA	415	SAN FRANCISCO	956-5777	956-5777
CO	303	BOULDER	337-6060	337-6060
CO	303	DENVER	337-6060	337-6060
DE	302	WILMINGTON	454-7710	454-7710
FL	305	MIAMI	372-0230	372-0230
FL	813	TAMPA	224-9920	224-9920
GA	404	ATLANTA	523-0834	523-0834
HI	808	OAHU	528-0200	528-0200
HI	808	OTHER ISLANDS	272-5299	272-5299
IA	515	DES MOINES	288-4403	288-4403
ID	208	BOISE	343-0611	343-0611
IL	312	CHICAGO	938-0500	938-0600
IN	317	INDIANAPOLIS	299-0024	299-0024
KS	816	KANSAS CITY	221-9900	221-9900
KY	502	LOUISVILLE	589-5580	589-5580
LA	504	NEW ORLEANS	524-4094	524-4094
MA	617	BOSTON	292-0662	292-0662
MA	617	CAMBRIDGE	292-0662	292-0662
MA	617	WOODS HOLE	540-7500	540-7500
MI	313	ANN ARBOR	996-5995	996-5995
MN	612	MINNEAPOLIS	341-2459	341-2459
MO	314	ST. LOUIS	421-4990	421-4990
NV	702	LAS VEGAS	737-6861	737-6861
NJ	609	PRINCETON	799-5587	799-5587
NY	212	NEW YORK	741-8100	741-8100
TN	615	NASHVILLE	244-3702	244-3702
TX	214	DALLAS	748-6371	748-6371
TX	713	HOUSTON	227-1018	227-1018
WA	206	SEATTLE	625-9612	625-9612
* CANADA	613	OTTOWA	237-6540	237-6540

* This is a local DATAPAC telephone number.

a) The user first dials the TELENET access number and enters carriage returns (<CR>) until the "@" prompt appears.

b) Next, the user should enter the identification code ID ;32107035/GSFC <CR> for the DIS VAX computer after the "@" prompt. The user should note that there must be a space between "ID" and the semicolon. In Canada, the user should dial the local DATAPAC number and specify the code 1311032107035 (one-digit USA code followed by four-digit TELENET code and then the NSSDC computer code).

c) The user will then be prompted for a password. At this time, he should enter the password 036156 followed by <CR>.

d) The user will then be welcomed to the NSSDC VAX 8650 computer system, which, however, is not the DIS VAX computer. After the "USERNAME:" prompt, the user should enter the VAX username, SPAN. The computer will respond with "ENTER HOST NAME OF SPAN NODE OR QUIT". The user should respond NSSDC for the final switch to the DIS VAX computer system and proceed as discussed in Section 2.4.

2.3.1.2 DIS VAX Dial-In Access

GSFC has recently switched to a new phone system. Consequently, new phone numbers are available to access the DIS VAX 11/780. The user must now access the GSFC modem pool and then type in the DIS numbers. The following numbers are for the GSFC modem pool along with their corresponding baud rate:

286-6699 (1200 baud)
286-6698 (2400 baud)
286-6697 (300 baud)
or 286-9000 (autobaud; 2400, 1200 or 300 baud rates are automatically selected)

The DIS user must first dial the appropriate number listed above and upon connection will be prompted: CALL, DISPLAY, OR MODIFY?. The user should enter CALL CDDIS to access the system. In addition, the user can specify the actual computer phone numbers by entering CALL 59895 or CALL 50075. If a successful connection is made, the user is answered with CALL COMPLETE. The user will then be prompted for the NSSDC VAX 11/780 (the user may need to type a few carriage returns to get this prompt). At this point, the user may then log into the DIS account following the procedure specified in Section 2.4.

2.3.1.3 Alternate Dial-In Method

An alternate method of access to the DIS is to connect through the NASA Packet Switch Network. The user would call one of the numbers listed above and after the CALL, DISPLAY OR MODIFY? prompt, the user should type CALL NPSS. After a successful connection to the Packet Switch network is established, the following interaction should take place:

NASA PACKET NETWORK - PSCN

ready
logon (the user types this after the "" prompt)

Enter Userid> NASA1 <CR>
Enter Password> SPAN <CR>
Enter Service> NSSDC <CR>

Note: The responses must be in capital letters

The system will then display the computer logon messages notifying the user that he has just accessed the NSSDCA VAX 8650. To get through the network to the DIS VAX (also the NSSDC VAX 11/780), the user should enter SPAN after the USERNAME: prompt. At this point, the computer will respond with "ENTER HOST NAME OF SPAN NODE OR QUIT." The user should type NSSDC, to gain access to the DIS VAX and the USERNAME: prompt. The DIS user will then log into the DIS account in the appropriate manner specified in Section 2.4.

2.3.3 Network Access to the DIS

The Crustal Dynamics DIS is presently operational on the NSSDC Computing Facility (NCF) at GSFC. The SPAN (Space Physics Analysis Network) and SESnet networks are accessible to the DIS through the NCF. For authorized users, the DIS can be accessed through the SPAN network by changing the host to NSSDC, i.e., SET HOST NSSDC. The SET HOST command is a VAX DECnet software convention and is issued at the user's end node. After issuing this command, the user will be prompted for the DIS VAX and should follow the prompt by logging into the DIS in the usual manner explained in Section 2.4.

2.4 Initial Login

After connection to the DIS VAX computer is established, the following interaction should take place:

Username: UNAME <CR>
Password: PNAME <CR>

where "UNAME" and "PNAME" are the computer username and passwords supplied by the DIS staff and described above. Next, several VAX system related messages will appear, followed by:

Please enter your DIS username: DISUNAME <CR>

where "DISUNAME" is the individual-specific DIS username also described above. The user now has access to the Crustal Dynamics Project's Data Information System.

The user will be prompted for the type of terminal to be used. If the user has a VT100 terminal, he should type Y(es); otherwise N(O). Some of the special screen displays of the ORACLE data base management systems use the programmable keyboard of the VT100 for querying the data base. After selecting

the type of terminal, the user will be prompted to enter a menu selection. If he is unfamiliar with the DIS, he should enter a "?". The user will then be shown the opening screen of the DIS and then is advanced to the main menu of the system as shown in Figure 1-2.

If any problems are incurred (i.e., an abnormally lengthy response time, etc.), the user may enter the <CTRL> and <C> keys simultaneously. This action will force the current process to halt and return the user to the main menu. If the user continues to experience difficulties with the computer system, he should break the connection to the DIS computer by hanging up the phone (if connected via modem) and dialing again to re-establish connection to the DIS.

2.5 User Assistance

2.5.1 Who To Contact

Any questions or suggestions concerning the DIS should be directed to the DIS staff:

Mr. Henry G. Linder	Ms. Carey E. Noll	Ms. Jeanne M. Behnke
NASA/GSFC	NASA/GSFC	NASA/GSFC
Code 634	Code 634	Code 634
(301) 286-2052	(301) 286-9283	(301) 286-8340

2.5.2 Sending Messages to the DIS Staff

Users wishing to send electronic messages to the DIS staff members listed in Section 2.5.1 can do so in one of several ways: from the DIS itself, from BITNET, MARK III, or through the TELEMAIL or TELEX systems. In addition to reporting data problems and system questions, users can employ personal computer communications packages to send small data files to the staff for inclusion in the DIS. The DIS staff would like to encourage users to take advantage of this electronic communication capability. The following sections will discuss the various access options in greater detail.

2.5.2.1 From the DIS

Users may send messages to the DIS staff members while accessing the DIS itself. In order to perform this function, the user must first log-on to the DIS in the usual manner. After viewing the initial log-on messages, the user should enter a "Y" response to the question concerning display of the introductory section which uses the VAX MAIL facility. Alternatively, the VAX MAIL utility may be accessed through DIS Main Menu Items 4 (Crustal Dynamics Bulletins) or 5 (DIS News). The user will then view a MAIL> prompt. At this point, the user may read messages contained in this introductory section or he may send a message to a DIS staff member. To send a message, the user should perform the following interaction:

```
MAIL> SEND
To:     NOLL (or BEHNKE)
Subj:   <<Subject of user message>>
Enter your message below. Press CRTL/Z when complete, CRTL/C to quit
```

The user should enter a message at this time, using <CR> to delimit each line. When finished, the user should simultaneously depress the <CTRL> and <Z> keys to send the message, or the <CTRL> and <C> keys to abort the sending of the message. Upon completion of the message, the user should enter EXIT to return to the DIS Main Menu prompt. The user may now proceed with normal use of the DIS.

2.5.2.2 Using SPAN

The SPAN network that the DIS VAX is connected to has an ever-increasing membership. The usage of SPAN permits users more direct access to the VAX for usage of DIS and contacts. The Crustal Dynamics DIS is presently operational on the NSSDC Computing Facility (NCF) at GSFC. The SPAN (Space Physics Analysis Network) and SESnet networks are accessible to the DIS staff through the NCF. The SPAN node name for the DIS is NSSDC. Any correspondence can be addressed to either NSSDC::NOLL or NSSDC::BEHNKE. If there are any questions concerning SPAN, please contact the DIS staff.

2.5.2.3 Using BITNET

Users can also access the DIS staff through BITMAIL on the GSFC AMDAHL-V6 node. The use of this system will be especially beneficial in acquiring timely information from BITNET users. DIS personnel are accessible through the account TGJBB@VPFVM.

In addition, BITNET users can send messages from BITNET, through SPAN (Space Physics and Analysis Network) to the staff members at the NSSDC Computing Facility's VAX (SPAN node NSSDC). The following address syntax information may be used to exchange messages between SPAN (DECnet-based) and BITNET users:

From BITNET to SPAN -- <username>%<SPANnodeneame>.SPAN@SU-STAR.ARPA

e.g., NOLL%NSSDC.SPAN@SU-STAR.ARPA (to contact Carey Noll)
or, BEHNKE%NSSDC.SPAN@SU-STAR.ARPA (to contact Jeanne Behnke)

From SPAN to BITNET -- STAR::"<username>%<BITNETnodename>.BITNET@WISCVM.ARPA"

e.g., STAR::"TGJBB%VPFVM.BITNET@WISCVM.ARPA" (to contact Jeanne Behnke)

2.5.2.4 Using MARK III

The Crustal Dynamics DIS has access to the world-wide computer network MARK III providing data communication on a dedicated node with the geodynamics community and the time services of the U.S. Naval Observatory and the Bureau International de l'Heure (BIH). The MARK III services are not directly interactive with the established data bank of the DIS, but provide a valuable communications capability for readily obtaining analyzed data products such as earth rotation parameters, length-of-day values, and other analyzed data products from participants in the MERIT campaign and its recent extension. The MARK III account name for the Crustal Dynamics DIS is CDDIS. Any users of MARK

III wishing to contact us should use that name. The MARK III account CDDIS will also be used in the MEDLAS campaign for data analysis distribution and related activities for conducting the campaign.

2.2.5.5 Through TELEMAIL

DIS users wishing to contact the DIS staff may do this through any one of these mediums. Henry Linder's TELEMAIL address is [HLINDER/GSFCMAIL] GSFC/USA.

2.2.5.6 Through TELEX

The TELEX system is also used for regular written correspondence particularly for information on foreign laser station operation. The TELEX address for the DIS staff is:

Henry Linder
Data Manager, Crustal Dynamics Project
NASA GSFC Code 634
TELEX: 89675 NASCOM GBLT

3. Using the System

This portion of the users guide describes in detail the various types of information available through the DIS. Each sub-section will discuss in detail the DIS main menu items.

There are various methods of obtaining help with the DIS information system. It is recommended that the user review this guide before accessing DIS in order to gain full benefit of the system. Itemized help is available before each menu item and an online help facility is available to provide even more information and instruction to the user.

Users are also offered information concerning the operation of each menu item in the DIS. The user is prompted at each menu item line to type a "?" for further explanation of the menu or process. For example, the user initially enters the "expert" mode when beginning DIS. This enables an experienced user to bypass the help information that a new user may want to see. For this reason, the menu options numbers, including a "?", are presented in a single line at the bottom of the screen. By typing "?" at the prompt, the DIS will return to a "tutorial" mode, displaying the corresponding name of each menu item and giving users more information for which to base their selection. Before executing most programs or screens in the DIS, the user will see the following prompt:

DIS>Enter RETURN to continue (? for further information):

This indicates that a brief help message is available. By typing the "?" at this point, the message is displayed on the screen and the user is once again requested to make a menu selection. Help is also available from within programs resident in the DIS, e.g., the VLBI Data Base Handler and the Jordan-Minster programs.

3.1 DIS HELP Facility

The on-line HELP facility of the DIS provides assistance with the history of the data sets contained in the DIS as well as use of the system itself. The HELP facility provides information on five major topics of interest to the DIS user: COMBINED efforts, the DBMS, DIS, LASER, and VLBI. The user selects one of these five topics by typing it's name after the "TOPIC?" prompt. A brief explanation on the topic is displayed, followed by an indication of more subtopics. The user may see the subtopic information by entering the name of the subtopic after the prompt. By typing a carriage return, the user moves back to the "TOPIC?" level of HELP. The user can move forward and backward through the online HELP facility in this tree-structured fashion. For example, if the user entered "DBMS" after the topic prompt, information about the ORACLE data base management system will be displayed along with any other available subtopics of this subject. A subtopic of "DBMS" is "LANGUAGE." The user enters "LANGUAGE" after the subtopic prompt for information on the DBMS language (see Figure 3-1). The topic, "DIS", displays information on the usage of the DIS system and, in particular, the menus. The topics "LASER" and "VLBI" display information on data sets collected from the VLBI experiments and the laser ranging operations. The topic COMBINED refers to data from the various institutions, such as BIH, MIT and JPL, that have used SLR, LLR, VLBI and other types of data in their solutions. Under the major topics, users are informed that help is available on GSFC, NEWUSER, and PROTRAN subjects. To access these subjects the user must type an "@" in front of the topics. The NSSDC system has developed these topics primarily with NSSDC personnel in mind and they are not particularly useful to DIS users. However, they are available if users are interested in them. To exit the HELP Facility, the user should travel backwards through the HELP "tree" until the DIS main menu prompt is displayed.

3.2 Interactive Data Base Management System

The ORACLE Data Base Management System (DBMS) allows the user to access the various Crustal Dynamics data sets that have been acquired. These data records are stored as rows of tables. For example, these tables may contain yearly catalogues of LAGEOS data, analyzed data sets received from a particular institution, or occupation histories. The user may access the tables through a screen display (see Section 3.8) or by executing an SQL (Structured Query Language) query. The various categories of SQL queries accessible to the user are shown in the menu presented in Figure 3-2. Following selection of one of these categories, the user will view a list of pre-programmed queries. Figures displaying these lists are presented in the subsequent sections. The user may then take note of particular names, and enter <CR> to advance to the UFI> prompt. Any of these names can then be executed by simply entering @QNAME, where QNAME is the name of the query. Alternatively, if the user is familiar with the SQL query language, he can by-pass these menus and continue to enter his own procedures. The results of the query will be displayed one screen page at a time; if the user wishes to disable this pausing feature, he should enter SET PAUSE OFF after the UFI> prompt.

This menu-oriented query process allows the user to view the data contained in the data base through a series of predetermined queries. Therefore, familiarity with the SQL query language is not required. However, displaying the queries (using the LIST command after query execution) will give the novice

```
  Additional information available:

  COMBINED   DBMS       DIS        LASER      VLBI

Topic? DBMS <CR>


DBMS

      The ORACLE Data Base Management System (DBMS) is a major component
    of the DIS.  It allows the user to access the various data sets which
    have been acquired.  These data sets exist as tables and are accessible
    via the ORACLE query language (SQL) or an avaliable screen display.


  Additional information available:

  LANGUAGE

DBMS Subtopic? LANGUAGE <CR>


DBMS

  LANGUAGE


    Additional information available:

    SQL

DBMS LANGUAGE Subtopic? SQL <CR>


DBMS

  LANGUAGE

    SQL

        SQL is a relational data language that provides a unified
      set of facilities for query, data manipulation, data
      definition, and data control.

        SQL was developed by IBM as the main external interface to
      be supported by System R, IBM's experimental relational data
      base management system.  In 1976, a complete BNF syntax for SQL
      was published in the "IBM Journal of Research and Development."
      In 1977, RSI began the development of ORACLE incorporating the
      SQL language.

        ORACLE is based on the relational model of data.  The
      advantages of the relational model with a non-procedural
      language are ease of use, maximum data independence, and
      flexibility.  SQL is an easy to learn English-like language
      that enhances a user friendly interface.  It is a high-level
      non-procedural language offering greater data independence than
      conventional procedural data base languages.  SQL allows
      complete flexibility in the formulation of statements relating
      data in the data base.

DBMS LANGUAGE Subtopic? <CR>

DBMS Subtopic? <CR>

Topic? <CR>
```

Figure 3-1. DIS HELP Example

```
**********************************************************************************

                    U F I   Q U E R Y   M E N U

     1 -- Polar Motion Earth Rotation, and Length-of-Day Queries

     2 -- Baseline Queries

     3 -- Solved-for Station Position Queries

     4 -- Laser Catalogues and VLBI Experiment Information Queries

     5 -- Ancillary Information Queries

     6 -- Direct Access to UFI

     7 -- Exit to Main DIS Menu

QUE>Please enter your query category selection (? for further information)
```

Figure 3-2. SQL Query Menu

user the opportunity to see how a query is constructed and provide instruction in how to create his own procedures. After leaving UFI (by typing EXIT), the user is returned to the UFI Query Sub-Menu.

The following sections discuss each of the SQL Query Menu selections. For those queries pertaining to analyzed results, the various contributing institutions are listed in each section. The user is cautioned that the data sets named here may be revised as new computational methods are employed by contributing institutions or additional data sets may be added by new analysis centers.

Appendix A of this document provides further instruction on the construction of SQL queries and the use of UFI. In addition, the user may enter HELP following the UFI> prompt at any time during the query session. This feature will provide help on those SQL and UFI commands available to the user.

3.2.1 Polar Motion, Earth Rotation, and Length-of-Day Query Menu

The Polar Motion, Earth Rotation, and Length-of-Day Query Menu is shown in Figure 3-3. Queries listed in this menu will display data from tables containing both SLR and VLBI results and from a variety of computing centers. At present, the DIS has SLR polar motion data from the GSFC Laser Support Group and the University of Texas; LLR earth rotation results from JPL; VLBI earth rotation results from GSFC's VLBI Science Support Team and the JPL Deep Space Network (DSN); and earth rotation results computed from a combination of technologies from MIT and JPL. An example of a query to the PMOTION_BIH polar motion table and the resulting display is shown in Figure 3-4.

In addition to these individual solutions, the DIS contains polar motion results derived from the intensive MERIT campaign. These solutions fall into two categories: results computed during the campaign by the operational centers and results computed upon completion by the analysis centers. The DIS currently contains SLR MERIT polar motion results from the Deutsches Geodatisches Forschungsinstitut (DGFI) in West Germany, the Main Astronomical Observatory of the Ukrainian Academy of Sciences (GAOUA), the Groupe de Recherches de Geodesie Spatiale (GRGS) in France, GSFC, the National Aerospace Laboratory (NAL) in Japan, Shanghai Observatory (SHA) in China, the University of Padua (UPAD) in Italy, and the Zentral Institut fur Physic der Erde (ZIPE) in the GDR; LLR MERIT polar motion results from the Centre d'Etudes et de Recherches Geodynamics et Astronomiques (CERGA) in France and JPL; VLBI MERIT polar motion results from the Harvard/Smithsonian Center for Astrophysics (CFA), GSFC, JPL, NGS, and the U.S. Naval Observatory (USNO); optical astronomy MERIT polar motion results from the Bureau International de l'Heure (BIH) in France and the International Polar Motion Service (IPMS) in Japan; and Circular D values from the BIH.

3.2.2 Baseline Query Menu

The Baseline Query Menu is shown in Figure 3-5. Currently, the DIS data base contains both yearly and monthly SLR baseline data from GSFC's Laser Support Group; fixed VLBI baseline data from GSFC's VLBI Science Support Team, IRIS/POLARIS baseline data from NGS, DSN VLBI baseline data, and mobile VLBI baseline data from NGS and JPL. An example of a query to the BASELINE_VLBIJPL baseline table and its associated result is shown in Figure 3-6.

```
          POLAR MOTION, EARTH ROTATION, LENGTH-OF-DAY QUERY LIST


@PMSG## -- All GSFC SLR Polar Motion Data for 19## (## = 79-83)
@PMSGM  -- All GSFC SLR Polar Motion Data (MERIT Solution)
@PMST## -- All U. of Texas SLR Polar Motion Data for 19## (## = 83-86)
@PMVJ   -- All JPL VLBI Polar Motion Data
@PMVN   -- All NGS VLBI Polar Motion Data
@PMBIH  -- All BIH Polar Motion Data
@ERLJ   -- All JPL LLR Earth Rotation Data
@ERMIT  -- All MIT Earth Rotation Data
@ERVG   -- All GSFC VLBI Earth Rotation Data
@LODSGM -- All GSFC SLR Length-of-Day Data (MERIT Solution)
@LODVN  -- All NGS VLBI Length-of-Day Data



QUE>Enter RETURN to continue to UFI ('EXIT' to leave UFI):
```

Figure 3-3. Polar Motion, Earth Rotation, and Length-of-Day Query Menu

```
UFI> @PMBIH
DOC>*****  PMBIH
DOC>
DOC>      Select all columns and entries from the table containing the earth
DOC>      rotation parameters from the BIH (PMOTION_BIH).  This series
DOC>      (number 482) is derived from optical astronomy and results from a
DOC>      recent revision (described in the Bulleting G OD Sique reprint).
DOC>      The BIH suggests using this series for polar motion up to 1971 and
DOC>      for universal time up to 1977.
DOC>
DOC>      The following are the associated column definitions and units:
DOC>
DOC>      Obs. Date -- Epoch date (DD-MON-YY)
DOC>      MJD -- Modified Julian date
DOC>      X,Y Pole Component -- X and Y coordinate of the pole (seconds)
DOC>      UT-UTC -- UT - UTC (seconds)
DOC>      Duration -- Duration of the day (milliseconds)
DOC>      Error in X, Y -- Standard error on the X coordinate of the pole
DOC>                       (seconds)
DOC>      Error in UT-UTC -- Standard error on UT - UTC (seconds)
DOC>      Error in Dur. -- Standard error on the duration of the day
DOC>                       measurement (seconds)
DOC>
DOC>#

<RETURN> to continue
Tue Feb  3                                                          page    1

                BIH Optical Astronomy Earth Rotation Parameters Solution

Obs. Date    MJD        X Pole Component  Error in X  Y Pole Component  Error in Y  UT-UTC     Error in UT-UTC  Dur.     Error in Dur
---------    ---------  ----------------  ----------  ----------------  ----------  ---------  ---------------  ------   ------------
04-JAN-62    37669.000        0.0187        0.0224        0.2512         0.0184     0.03253       0.00148      0.01        0.00
09-JAN-62    37674.000        0.0044        0.0169        0.2838         0.0138     0.03207       0.00127      0.00        0.00
14-JAN-62    37679.000        0.0065        0.0130        0.2692         0.0127     0.02869       0.00120      0.00        0.00
19-JAN-62    37684.000       -0.0328        0.0141        0.3077         0.0124     0.02677       0.00111     -0.04        0.00
24-JAN-62    37689.000        0.0097        0.0096        0.2806         0.0090     0.03179       0.00078      0.00        0.00
29-JAN-62    37694.000       -0.0399        0.0135        0.2938         0.0133     0.03331       0.00123     -0.04        0.00
03-FEB-62    37699.000       -0.0274        0.0129        0.2948         0.0149     0.03281       0.00120     -0.03        0.00
08-FEB-62    37704.000        0.0079        0.0134        0.2573         0.0113     0.03071       0.00109      0.00        0.00
13-FEB-62    37709.000        0.0070        0.0141        0.2885         0.0130     0.02537       0.00106      0.00        0.00
18-FEB-62    37714.000       -0.0037        0.0134        0.3137         0.0133     0.02547       0.00104     -0.01        0.00
23-FEB-62    37719.000       -0.0005        0.0130        0.2936         0.0142     0.02976       0.00127     -0.01        0.00
28-FEB-62    37724.000       -0.0070        0.0147        0.3023         0.0122     0.02653       0.00104     -0.01        0.00
05-MAR-62    37729.000        0.0529        0.0188        0.3033         0.0197     0.02201       0.00200      0.05        0.00
10-MAR-62    37734.000        0.0375        0.0123        0.3183         0.0100     0.02039       0.00095      0.03        0.00
15-MAR-62    37739.000        0.0690        0.0114        0.3264         0.0110     0.02003       0.00098      0.06        0.00
20-MAR-62    37744.000        0.0585        0.0117        0.3216         0.0115     0.01859       0.00109      0.05        0.00
25-MAR-62    37749.000        0.0410        0.0097        0.3190         0.0095     0.01438       0.00088      0.04        0.00
30-MAR-62    37754.000        0.0777        0.0126        0.3275         0.0142     0.01645       0.00115      0.07        0.00
04-APR-62    37759.000        0.0859        0.0111        0.3027         0.0105     0.01057       0.00096      0.08        0.00
09-APR-62    37764.000        0.0862        0.0136        0.2703         0.0124     0.00887       0.00116      0.08        0.00
14-APR-62    37769.000        0.0933        0.0129        0.2948         0.0138     0.00718       0.00125      0.09        0.00
<RETURN> to continue


<RETURN> to continue
Tue Feb  3                                                          page   70

                BIH Optical Astronomy Earth Rotation Parameters Solution

Obs. Date    MJD        X Pole Component  Error in X  Y Pole Component  Error in Y  UT-UTC     Error in UT-UTC  Dur.     Error in Dur
---------    ---------  ----------------  ----------  ----------------  ----------  ---------  ---------------  ------   ------------
05-NOV-81    44914.000       -0.0961        0.0113        0.2558         0.0093     0.14100       0.00093     -0.09        0.00
10-NOV-81    44919.000       -0.1172        0.0109        0.2499         0.0092     0.12820       0.00079     -0.11        0.00
15-NOV-81    44924.000       -0.0916        0.0120        0.2489         0.0096     0.11700       0.00079     -0.09        0.00
20-NOV-81    44929.000       -0.0954        0.0120        0.2696         0.0095     0.10778       0.00078     -0.09        0.00
25-NOV-81    44934.000       -0.1079        0.0103        0.2922         0.0093     0.09504       0.00080     -0.10        0.00
30-NOV-81    44939.000       -0.0903        0.0103        0.3021         0.0087     0.08589       0.00070     -0.09        0.00
05-DEC-81    44944.000       -0.1155        0.0111        0.2997         0.0081     0.07546       0.00067     -0.11        0.00
10-DEC-81    44949.000       -0.1093        0.0156        0.3192         0.0127     0.06282       0.00100     -0.10        0.00
15-DEC-81    44954.000       -0.0934        0.0097        0.3067         0.0084     0.05123       0.00070     -0.09        0.00
20-DEC-81    44959.000       -0.1223        0.0102        0.3401         0.0082     0.03951       0.00065     -0.12        0.00
25-DEC-81    44964.000       -0.1420        0.0123        0.3616         0.0086     0.03089       0.00066     -0.14        0.00
30-DEC-81    44969.000       -0.1602        0.0144        0.3733         0.0108     0.02198       0.00101     -0.16        0.00

1461 records selected.

UFI>
```

Figure 3-4. Polar Motion Query Example

```
                    BASELINE QUERY LIST


@BLSG##   -- All GSFC SLR Baselines for 19## (## = 79-85)
@BLSG##1  -- GSFC SLR Baselines for a Specified Station in 19## (## = 79-85)
@BLSG##2  -- GSFC SLR Baselines for a Specified Pair of Stations in 19##
             (## = 79-85)
@BLVG     -- All GSFC VLBI Baselines
@BLSVG    -- All GSFC VLBI Baseline Summary Data
@BLVJ     -- All JPL VLBI Baselines
@BLVN     -- All NGS VLBI Baselines
@BLMVN    -- All NGS Moblie VLBI Baselines




QUE>Enter RETURN to continue to UFI ('EXIT' to leave UFI):
```

Figure 3-5. Baseline Query Menu

```
UFI> @BLVJ
DOC>*****   BLVJ
DOC>
DOC>      Display all baseline information from the JPL VLBI Baseline Data table
DOC>      (BASELINE_VLBIJPL)
DOC>
DOC>      The following are the associated column definitions and units:
DOC>
DOC>           From/To Site -- VLBI "from" and "to" site names
DOC>           Expt. -- VLBI Experiment designator
DOC>           Obs. Date -- Experiment date
DOC>           Components -- X, Y, and Z components of the baseline (meters)
DOC>           Corr. Coeff. -- XY, XZ, and YZ correlation coefficients (meters)
DOC>           Distance -- Baseline distance (meters)
DOC>#
<RETURN> to continue
```

Expt	Obs. Date	From/To Site	Baseline Distance	Components (X,Y,Z)	C. Coeffs. (XY,XZ,YZ)
80BX	05-JAN-80	OVRO 130	257587.458+/-0.019	58471.591+/-0.054	0.697994
		DSS 13		-177127.578+/-0.078	-0.568118
				-177646.257+/-0.065	-0.910894
80BX	05-JAN-80	OVRO 130	335941.479+/-0.039	-83705.123+/-0.066	0.572962
		JPL		-176848.193+/-0.099	-0.543785
				-273083.955+/-0.080	-0.811026
80BX	05-JAN-80	DSS 13	171238.576+/-0.036	-142176.715+/-0.055	0.749808
		JPL		279.385+/-0.101	-0.669309
				-95437.696+/-0.080	-0.754737
80GX	10-JUN-80	OVRO 130	335941.500+/-0.036	-83705.170+/-0.058	0.497742
		JPL		-176848.181+/-0.079	-0.568575
				-273083.973+/-0.071	-0.759864
8018	28-JUL-80	OVRO 130	335941.477+/-0.031	-83705.115+/-0.047	0.667197
		JPL		-176848.248+/-0.078	-0.752743
				-273083.919+/-0.067	-0.780773

<RETURN> to continue

<RETURN> to continue

Expt	Obs. Date	From/To Site	Baseline Distance	Components (X,Y,Z)	C. Coeffs. (XY,XZ,YZ)
H84R	31-OCT-84	MOJAVE	195109.756+/-0.017	-13464.983+/-0.050	0.964642
		PINYON FLATS		-114569.203+/-0.096	-0.938864
				-157354.405+/-0.077	-0.963140
H84R	31-OCT-84	MOJAVE	362912.367+/-0.014	159393.051+/-0.054	0.963766
		YUMA_7894		-240581.193+/-0.105	-0.935815
				-220045.294+/-0.081	-0.969749
H84R	31-OCT-84	PINYON FLATS	222910.450+/-0.017	172858.033+/-0.043	0.902407
		YUMA_7894		-126011.990+/-0.082	-0.823408
				-62690.888+/-0.062	-0.904554

```
408 records selected.

UFI> ^Z
UFI>
```

Figure 3-6. Baseline Query Example

3.2.3 Solved-for Station Positions Query Menu

The Solved-for Station Positions Query Menu is shown in Figure 3-7. The DIS data base contains SLR station position data from GSFC's Laser Support Group, fixed VLBI station position data from GSFC's VLBI Science Support Team and from NGS, mobile VLBI station position data from JPL and NGS. An example of an available query to the POSITIONS85_SLRGSFC station position table is shown in Figure 3-8.

3.2.4 Laser Catalogue and VLBI Experiment Information Query Menu

The Laser Catalogue and VLBI Experiment Information Query Menu is shown in Figure 3-9. Catalogues of data from the three major SLR satellites used by the Project are available in yearly increments; each satellite is stored separate, yearly tables. Presently, the archive of LAGEOS, BE-C, and STARLETTE data spans 1976 through the present and represents information received from the NASA laser network as well as participating European stations. In addition, an EGS data catalogue exists for 1986. Each row in a catalogue tables represents one pass obtained from the satellite and has the following fields: start date, time, and seconds of the pass, end date, time and seconds of the pass, the four-digit observing monument number, the total number of observations for the pass, the seven-digit satellite number, and the data processing version code of the pass. The pre-processed data summarized in these catalogues is stored off-line in the DIS tape archive. An example of a SQL query to the table of 1986 LAGEOS data (LAGEOS_86) is shown in Figure 3-10.

In addition to summary catalogues of the final versions of the pre-processed laser data, tables containing laser pass information for recent years are available to DIS users. Each row of the pass table represents one pass of data and contains the following fields: the date of the LAGEOS pass, the occupying system taking the pass, the monument number of the system, the number of points retrieved during the pass, the start time of the pass, the end time of the pass, the timing bias associated with the pass, and the code corresponding to the pass.

Catalogues of LLR normal point (N card) data for 1969 through 1986, as well as the associated ancillary (Z card) data, are also available. The actual LLR shot (P card) data are stored off-line on magnetic tape.

VLBI experiment information corresponding to the submitted analyzed results can be perused in the DIS. Both fixed VLBI experiments from GSFC and mobile VLBI experiments from JPL can be selected from the data base using pre-programmed queries.

3.2.5 Ancillary Information Query Menu

Ancillary information pertaining to SLR and VLBI pre-processed and analyzed data can be listed by specifying a query from the menu shown in Figure 3-11. A priori monument and differential coordinates, system eccentricity values, a priori star positions, atmospheric angular momentum data, and system occupation histories are among the ancillary data sets available in the DIS. Figure 3-12 illustrates a query from the Ancillary Information Query Menu to display information from the VLBI occupation listing.

```
                SOLVED-FOR STATION POSITIONS QUERY LIST


@SPSG##   -- All GSFC SLR Station Positions for 19## (## = 79-83)
@SPSGM    -- All GSFC SLR Station Positions (MERIT Solution)
@SPSG##1  -- GSFC SLR Station Position for a Specified Station in 19##
             (## = 79-84)
@SPVG     -- All GSFC VLBI Station Positions
@SPVG1    -- All GSFC VLBI Station Positions for a Specified Station
@SPVJ     -- All JPL VLBI Station Positions
@SPVJ1    -- All JPL VLBI Station Positions for a Specified Station
@SPMVN    -- All NGS Mobile VLBI Station Positions
@SPMVN1   -- All NGS Mobile VLBI Station Positions for a Specified Station



QUE>Enter RETURN to continue to UFI ('EXIT' to leave UFI):
```

Figure 3-7. Solved-For Station Positions Query Menu

```
UFI> @SPSG82
DOC>*****   SPSG82
DOC>
DOC>       Select all columns and entries from the table containing the station
DOC>       positions computed by GSFC from SLR data for 1985
DOC>       (POSITIONS85_SLRGSFC).
DOC>
DOC>       The following are the associated column definitions and units:
DOC>
DOC>       Sta. No. -- Station number
DOC>       Latitude -- Calculated latitude
DOC>       Latitude Sigma -- Sigma on latitude determination
DOC>       Longitude -- Calculated longitude
DOC>       Longitude Sigma -- Sigma on longitude determination
DOC>       Height -- Calculated height
DOC>       Height Sigma -- Sigma on height determination
DOC>#

<RETURN> to continue
```

Sta. No.	Latitude	Latitude Sigma	Longitude	Longitude Sigma	Height	Height Sigma
1181	52 22 48.9432	0.0004	13 3 55.0354	0.0006	147.767	0.006
7086	30 40 37.3147	0.0003	255 59 2.6236	0.0004	1961.380	0.005
7090	-29 2 47.4147	0.0004	115 20 48.2650	0.0003	241.320	0.004
7105	39 1 14.1752	0.0001	283 10 20.3067	0.0001	19.130	0.005
7109	39 58 30.0130	0.0003	239 3 19.0868	0.0004	1106.279	0.004
7110	32 53 30.2568	0.0003	243 34 38.3972	0.0004	1838.924	0.004
7121	-16 44 0.6681	0.0007	208 57 31.9226	0.0008	43.526	0.012
7122	23 20 34.2595	0.0003	253 32 27.2999	0.0004	30.782	0.004
7210	20 42 25.9805	0.0001	203 44 38.7351	0.0005	3067.433	0.005
7545	39 8 7.6870	0.0016	8 58 22.7423	0.0052	231.229	0.051
7590	45 55 39.1734	0.0006	9 1 3.9096	0.0010	1649.511	0.009
7810	46 52 38.0091	0.0007	7 27 54.7743	0.0011	951.006	0.012
7834	49 8 41.7651	0.0005	12 52 41.1319	0.0006	661.120	0.006
7835	43 45 16.8730	0.0002	6 55 16.0241	0.0003	1322.811	0.004
7838	33 34 39.7035	0.0002	135 56 13.3292	0.0002	99.352	0.004
7839	47 4 1.6717	0.0006	15 29 36.0787	0.0007	539.332	0.008
7840	50 52 2.5553	0.0005	0 20 10.0301	0.0006	75.327	0.006
7843	-35 38 10.5208	0.0011	148 56 21.5149	0.0012	1349.814	0.022
7907	-16 27 56.6800	0.0003	288 30 24.7484	0.0005	2492.265	0.004
7939	40 38 55.7795	0.0005	16 42 16.8510	0.0005	535.768	0.005

```
20 records selected.

UFI>
```

Figure 3-8. Solved-For Station Positions Query Example

```
          LASER CATALOGUES AND VLBI EXPERIMENT INFORMATION QUERY LIST

@LAG    -- LAGEOS Catalogue for 19## (## = 76-86)
@LAG1   -- LAGEOS Catalogue for a Specified Station in 19## (## = 76-86)
@LAGS   -- LAGEOS Catalogue Summary for 19## (## = 76-86)
@LP     -- LAGEOS Pass Report for 19## (## = 85,86)
@LP1    -- LAGEOS Pass Report for a Specified Station in 19## (## = 85,86)
@LPS    -- LAGEOS Pass Report Summary for 19## (## = 85,86)
@LPY    -- LAGEOS Pass Report for a Specified System in 19## (## = 85,86)
@BEC    -- BE-C Catalogue for 19## (## = 76-86)
@BEC1   -- BE-C Catalogue for a Specified Station in 19## (## = 76-86)
@BECS   -- BE-C Catalogue Summary for 19## (## = 76-86)
@STAR   -- STARLETTE Catalogue for 19## (## = 76,79-81,84-86)
@STAR1  -- STARLETTE Catalogue for Specified Station in 19## (##=76,79-81,84-86)
@STARS  -- STARLETTE Catalogue Summary for 19## (## = 76,79-81,84-86)
@LNPST## -- U. of Texas SLR Normal Point Catalogue for 19## (## = 84)
@NPLT   -- U. of Texas LLR Normal Point Catalogue for 1969-1986
@EXPVG  -- GSFC VLBI Experiment Information
@EXPVJ  -- JPL VLBI Experiment Information

QUE>Enter RETURN to continue to UFI ('EXIT' to leave UFI):
```

Figure 3-9. Laser Catalogues and VLBI Experiment Information Query Menu

```
UFI> @LAGS
DOC>*****   LAGS
DOC>
DOC>       Display a selection from the LAGEOS data catalogue giving a
DOC>       summary of data acquisition for 19## (## = 76-86).  You will
DOC>       be prompted for the two-digit year.
DOC>
DOC>       The following are the associated column definitions and units:
DOC>
DOC>            Sta. No. -- 4-digit laser station identifier
DOC>            Site Name -- Site location
DOC>            No. of Passes -- Total number of passes for station during time
DOC>                             interval
DOC>            No. of Points -- Total number of observations during time interval
DOC>#

<RETURN> to continue
```

Sta. No.	Site Name	No. of Passes	No. of Points
1181	POTSDAM	58	2,990
7086	MCDONALD	176	91,191
7090	YARAGADEE	338	1,488,770
7105	GREENBELT	234	397,623
7109	QUINCY	227	1,053,736
7110	MONUMENT PEAK	381	1,415,982
7121	HUAHINE	36	13,357
7122	MAZATLAN	239	953,128
7210	HALEAKALA	181	564,857
7517	ROUMELLI	116	44,953
7520	KARITSA	101	150,786
7525	XRISOKALARIA	25	8,638
7530	BAR GIYYORA	36	17,934
7541	MATERA	184	116,827
7550	BASOVIZZA	58	29,354
7805	METSAHOVI	15	320
7810	ZIMMERWALD	27	4,196
7834	WETTZELL	189	203,794
7835	GRASSE	110	327,944
7838	SIMOSATO	288	209,405

```
<RETURN> to continue
```

Sta. No.	Site Name	No. of Passes	No. of Points
7839	GRAZ	125	43,023
7840	HERSTMONCEUX	536	283,169
7907	AREQUIPA	218	51,037
7939	MATERA	231	64,544

```
24 records selected.

UFI>
```

Figure 3-10. Laser Catalogue Query Example

```
                ANCILLARY INFORMATION QUERY LIST


@COORS  -- All SLR Coordinate Data
@ALVG   -- All GSFC VLBI A Priori Station Locations
@ALVJ   -- All JPL VLBI A Priori Station Locations
@CALS   -- All SLR Calibration Data
@ECCVG  -- All GSFC VLBI Eccentricity Information
@ECCVJ  -- All JPL VLBI Eccentricity Information
@ECCVN  -- All NGS VLBI Eccentricity Information
@ASVG   -- All GSFC VLBI A Priori Star Positions
@ASVJ   -- All JPL VLBI A Priori Star Positions
@ANLT   -- All U. of Texas LLR Ancillary Information for 1969-1986
@ATMN## -- NGS Atmospheric Angular Momentum Functions for 19## (## = 1976-1986)
@OCCS   -- SLR Occupancy List
@OCCV   -- VLBI Occupancy List



QUE>Enter RETURN to continue to UFI ('EXIT' to leave UFI):
```

Figure 3-11. Ancillary Information Query Menu

```
UFI> @OCCV
DOC>*****   OCCV
DOC>
DOC>       Select entries from the table containing the VLBI occupation list
DOC>       (OCCUPANCY_VLBI).
DOC>
DOC>       The following are the associated column definitions:
DOC>
DOC>       Occupying System -- System name
DOC>       Sta. No. -- Station number
DOC>       Location -- Site name
DOC>       Designator -- 8-Digit designator (1-4: station number,
DOC>                     5-6: system number, 7-8: monument occupation
DOC>                     sequence number)
DOC>       Start Date -- Starting date of occupation
DOC>       End Date -- Ending date of occupation
DOC>       Comments -- Relevant comments to the occupation
DOC>#

<RETURN> to continue
```

Sta. No.	Site Name	Occupying System	Occ. Desig.	Start Date	End Date	Comments
7203	EFFELSBERG	100-METER	72037901	25-NOV-79	06-MAY-83	NONE
7222	MOJAVE	12-METER	72227101	27-JUN-83	31-DEC-90	NONE
7282	ALGONQUIN	150-FOOT	72828201	01-JUL-84	31-DEC-90	NONE
7224	WETTZELL	20-METER	72247801	01-JUL-83	31-AUG-88	NONE
1562	MADRID	26-METER	15628401	05-MAY-83	31-DEC-91	NONE
1856	KASHIMA	26-METER	18567601	01-JAN-84	31-DEC-90	NONE
7219	RICHMOND	65-FOOT	72197502	16-MAR-85	31-DEC-90	NONE
7205	WESTFORD	HAYSTACK	72057401	09-SEP-76	31-DEC-90	NONE
7216	FORT DAVIS	HRAS 085	72167201	11-APR-80	31-DEC-90	NONE
7223	VANDENBERG	MV-1	72235101	01-AUG-83	07-MAR-84	NONE
7223	VANDENBERG	MV-1	72235102	08-MAR-84	31-DEC-90	NONE
7252	PRESIDIO	MV-1	72525101	06-JUN-77	09-JUN-77	DATA NOT INCLUDED IN ANALYZED RESULTS
7253	PEARBLOSSOM	MV-1	72535101	06-JUN-76	07-JUN-76	DATA NOT INCLUDED IN ANALYZED RESULTS
7253	PEARBLOSSOM	MV-1	72535102	14-NOV-77	16-NOV-77	DATA NOT INCLUDED IN ANALYZED RESULTS
7260	QUINCY	MV-1	72605101	09-MAY-79	09-MAY-79	DATA NOT INCLUDED IN ANALYZED RESULTS
7262	LA JOLLA	MV-1	72625101	09-JUL-77	10-JUL-77	DATA NOT INCLUDED IN ANALYZED RESULTS
7263	PASADENA	MV-1	72635101	25-AUG-74	03-AUG-75	DATA NOT INCLUDED IN ANALYZED RESULTS
7263	PASADENA	MV-1	72635102	15-JAN-76	27-JAN-76	DATA NOT INCLUDED IN ANALYZED RESULTS
7263	PASADENA	MV-1	72635103	19-AUG-76	21-AUG-76	DATA NOT INCLUDED IN ANALYZED RESULTS
7263	PASADENA	MV-1	72635104	19-AUG-77	18-OCT-77	DATA NOT INCLUDED IN ANALYZED RESULTS

```
<RETURN> to continue
```

```
<RETURN> to continue
```

Sta. No.	Site Name	Occupying System	Occ. Desig.	Start Date	End Date	Comments
7209	WESTFORD	WESTFORD	72097301	13-MAY-81	06-JUN-83	NONE

```
201 records selected.

UFI>
```

Figure 3-12. Ancillary Information Query Example

3.2.6 Direct Access to UFI

Upon selecting UFI Query Menu Item 6, the user is directly advanced to the UFI> prompt. Here, the user may enter any query of his own construction or any other pre-programmed query.

To determine what data sets (i.e., tables) are available in the data base, the user may query the DIS Data Dictionary facility. The Data Dictionary is a set of two tables which define the contents of all other DIS tables and their respective columns. When a new data set is implemented in the DIS data base, these dictionary tables are updated to reflect the added information.

The two tables which define this data dictionary are TABLE_INFO (having two columns, TABLE_NAME and TABLE_DESCRIPTION) and COLUMN_INFO (having four columns, TABLE_NAME, COLUMN_NAME, COLUMN_NO, and COLUMN_DESCRIPTION). As an example, the following query will yield an alphabetized listing of all tables in the data base and the type of information each contains:

```
UFI>SELECT *
UFI>FROM TABLE_INFO
UFI>ORDER BY TABLE_NAME;
```

After a user has determined the table to be accessed, this second query can be executed in order to obtain descriptions of the columns in a particular data base table (in this case table "tname").

```
UFI>SELECT COLUMN_NO, COLUMN_NAME, COLUMN_DESCRIPTION
UFI>FROM COLUMN_INFO
UFI>WHERE TABLE_NAME = 'tname';
```

An example from the DIS data dictionary report is shown in Figure 3-13. For a copy of the entire DIS data dictionary document, contact the DIS staff.

In addition, the user can enter a simple command which will list the name, number, and data type for each column in a table:

```
UFI>DESC[RIBE] tname
```

where "tname" is the name of the table in question.

Appendix A of this document presents more SQL and UFI examples.

3.3 VLBI Data Base Handler

The VLBI groups supporting the Crustal Dynamics Project, GSFC, JPL, and NGS, submit analyzed and processed data to the DIS in large packets. A list of all analyzed and processed data available from the DIS can be reviewed in a status report accessible right after signing into the DIS. The processed data is listed by experiment/data base file and is available to users upon formal request. The processed VLBI data can be viewed through the MARK-III Data Base Handler system, which was developed by the VLBI Science Support Team at GSFC. The Data Base Handler is accessible to users through the DIS Main Menu selection 3. The Data Base Handler provides the user with information about a

Table Name	Table Description
BASELINE_SLRTEXAS	Baseline solution computed by the University of Texas from SLR data

No	Column Name	Type	Size	Column Description
1	FROM_STATION	Num	4	"From" station number
2	TO_STATION	Num	4	"To" station number
3	ARC_DATE	Date	7	Mean arc date of observations from the station pair (DD-MON-YY)
4	MJD	Char	8	Mean modified Julian date of observations from the station pair
5	DAYS_DIFFERENCE	Char	6	From station mean time minus to station mean time (days)
6	YEAR_DIFFERENCE	Char	6	Mean time (MJD) expressed as year from 1980.0
7	DISTANCE	Char	12	Baseline length (millimeters)
8	DISTANCE_ERROR	Char	3	Formal standard deviation of baseline length (millimeters)

Table Name	Table Description
BASELINE_VLBIGSFC	Baseline solutions computed by GSFC from VLBI data

No	Column Name	Type	Size	Column Description
1	OBS_DATE	Date	7	Experiment date (DD-MON-YY)
2	FROM_SITE	Char	11	VLBI "from" site name (an "*" indicates WESTFORD results mapped to HAYSTACK)
3	TO_SITE	Char	11	VLBI "to" site name
4	DISTANCE	Char	12	Baseline distance (centimeters)
5	ERR	Char	4	Formal error on baseline determination (centimeters)
6	WEIGHTED_OBS	Num	4	Number of weighted observations
7	TOTAL_OBS	Num	4	Total number of observations

Table Name	Table Description
BASELINE_VLBIJPL	Baseline solutions computed by JPL from VLBI data

No	Column Name	Type	Size	Column Description
1	EXPT	Char	4	VLBI experiment designator
2	FROM_SITE	Char	15	VLBI "from " site name
3	TO_SITE	Char	15	VLBI "to" site name
4	EXPT_DATE	Date	7	Experiment date (DD-MON-YY)
5	MJD	Num	8	Modified Julian date
6	X_COMPONENT	Char	22	X component of the baseline (meters)
7	Y_COMPONENT	Char	22	Y component of the baseline (meters)
8	Z_COMPONENT	Char	22	Z component of the baseline (meters)
9	DISTANCE	Char	22	Baseline distance (meters)
10	CORR_XY	Char	10	XY correlation coefficient (meters)
11	CORR_XZ	Char	10	XZ correlation coefficient (meters)
12	CORR_YZ	Char	10	YZ correlation coefficient (meters)

Figure 3-13. DIS Data Dictionary Report Example

VLBI experiment after its processing has been completed. The user selects an experiment session from a list of online experiments/data base files and then browses the processed data. An experiment/data base file contains three types of data. A type 1 record contains information organized on a "per experiment" basis. Type 2 and 3 records contain VLBI observation data.

The Data Base Handler opens with a menu asking the user to select a activity to be performed. After performing each selection the Data Base Handler returns to the main menu as shown in Figure 3-14. After an experiment/data base file has been selected the file name is echoed back along with the version of the file online. This is followed by the main VLBI Data Base Handler menu. Central to the Data Base Handler is the Table of Contents which is divided into three sections, called NTOC's, according to the three types of data in the file. The user should specify the TC option, Table of Contents, to determine the data values, variables called LCODES, contained in the file for the three types of data. For example, UTC TAG, RAT OBSV, DEL OBSV, and BASELINE are typical LCODES of type 2 data values. The TC option lists all LCODES for each of the three data types.

The MO option moves a user through a specified number of records in the data base file. The MO command will also move through the file to one of the three data types. After selecting the MO command, the user is asked what data record type (for the LCODES of interest) is to be moved to and the number of observations to move forward. In this manner, the user can traverse the experiment. After MOving, the user can select the GE command to get the value of a particular LCODE. The GE command requires that the user know the parameters of the specific LCODE. These include data type, i.e., INTEGER, REAL, or ALPHA, and the dimensions of the LCODE found in the Table of Contents for each LCODE. The GE command returns the value of that variable at that observation in the data base file. The DU command will dump a group of pre-specified LCODES for a given number of observations. For the DU command, the user will need to know specific LCODES to be dumped and their parameters for the requested number of observations. After entering the LCODES, the Data Base Handler will dump to the terminal the specified data items. The AS command will display the parameters and definition of a specific LCODE, without having to go through the Table of Contents (TC command). The GH command gives users access to the history of an experiment file; errors and problems that have been encountered in processing. Finally, to exit the VLBI Data Base Handler, the user should enter the FI command. From there, the user is prompted again for the DIS main menu selections. By specifying the seven commands provided with the Data Base Handler, the user can investigate many aspects of VLBI processed data.

3.4 Crustal Dynamics Project Bulletin

Current and previous issues of the Crustal Dynamics Project Bulletin can be read through this Main Menu Item 4. This document is published by the Crustal Dynamics Project Office on a yearly basis to inform the geodynamics community of recent Project developments. A particular issue of the Project Bulletin can be browsed by entering DIR BULLETIN# (where # refers to the issue number of the Project Bulletin) following the MAIL> prompt. Specific articles from this issue can be viewed one at a time by specifying READ #, where # is the article number.

```
     AVAILABLE VLBI DATA FILES
gsfcvlbi:      85JUL25S       85JUL25X
85AUG24S       85AUG24X       85AUG28S
85AUG28X       85SEP11S       85SEP11X
85SEP30S       85SEP30X       85OCT25S
85OCT25X       85OCT29S       85OCT29X
85NOV20S       85NOV20X       85NOV21S
85NOV21X       85DEC10S       85DEC10X
********       jplvlbi:       H84J0484
H84K0784       H84L0784       H84M0784
H84N0884       H8401084       H84P1084
H84Q1084       H84R1084       ********
ngsvlbi:       N85OCT27X      N85OCT30X
N85NOV02X      N85NOV05X      N86JAN05X
N86FEB23X      N86FEB26X      *********
irisvlbi:      185NOV09X      185NOV14X
185NOV19X

SELECT VLBI DATA FILE:
86JUL31X
KAI--FNAME=DRC0:[DIS.DBH]86JUL31X
The VLBI data base handler has been opened with
  experiment file : @86JUL31X* Version   6
 NOTE: Data Base file name is not the same as the VAX file name !
 ************************************************************

The following MENU is available for reading a VLBI data file

       GH -- Get a history record

       TC -- Print the Table of Contents

       DU -- Dump specified data from the file

       AS -- Ask for an entry in the table of contents

       MO -- Move to a data record

       GE -- Get data from a data record

       FI -- Finish, exit from the VLBI data base handler

Name of operation ?
TC


Table of Contents for TOC Type 1 of Data Base @86JUL31X* Version   6

LCODE       Dimensions    Type  added at      Descriptor
                                Version

SITERECS    3   4   1     R*6       1     Site cartesian coords (meters)..
SITEZENS    4   1   1     R*6       1     Default zenith path delays(nsec)
STAR2000    2  14   1     R*6       1     J2000 source RAs, decs (rad,rad)
AXISOFFS    4   1   1     R*6       1     Axis offsets (meters).....
SLEWRATS    2   4   1     R*6       1     Antenna slew rates - rad/sec....
```

Figure 3-14. VLBI DBH Example

3.5 DIS News

The DIS News topic is available to inform users of current items of interest concerning the Crustal Dynamics Project and the DIS. For example, notices of upcoming Project meetings, DIS computer problems, an index to previous issues of the DIS Bulletin, etc. can be perused by accessing Main Menu Item 5. The DIS News topic can be accessed by entering DIR NEWS following the MAIL> prompt.

3.6 Investigator Data Exchange

Currently, the Investigator Data Exchange menu item provides access to the Jordan-Minster Program for plate motion modelling. This program accepts Crustal Dynamics Project site locations, as well as the names of the plates they belong to, and uses the RM2 rigid plate kinematic model to compute the three-dimensional relative motion vector between these two sites predicted by the plate-tectonic model. The plate model is given by the Eulerian rotation vectors in cartesian coordinates, and the associated (Gaussian) covariance matrix. The 3 X 3 covariance matrix attached to the predicted relative velocity vector is then estimated, and the output includes marginal standard deviations for the cartesian (XYZ) components, for the local (NEZ) components, and for the baseline rate-of-change. For an n-plate model, the first plate is often assumed to be fixed, or equivalently to have known motion in the chosen cartesian reference frame. The covariance matrix -- a 3N X 3N matrix -- is read for the Eulerian vectors.

To become familiar with this program's menu driven system, the user should initially type "help" (lower case) after the prompt "com:". An entry of "quit" will return the user to the Investigator Software Menu.

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September, 1982

REFERENCES: Minster et al. (1974) GJRAS 36 pp. 541-576.
Jordan (1975) JGR 80 pp. 4433-4439.
Minster and Jordan (1978) JGR 83 pp. 5331-5334.
Minster and Jordan (1980) in "Source Mechanism and Earthquake Prediction" (Coulomb Volume) pp. 109-124.
Minster and Jordan (1982) NASA CDP Report.

NOTES: This program is written in FORTRAN '77 and can be transported to any machine with a FORTRAN '77 compiler. However, translation into FORTRAN '66 should be relatively straightforward.

3.7 Reports Menu

Various reports are available to users of the DIS. These items include displays of the proposed Crustal Dynamics Project SLR and VLBI system schedules and current SLR processing status summaries. A menu of these reports is shown in Figure 3-15.

3.7.1 Proposed SLR and VLBI System Schedules

The SLR and VLBI mobile system schedules generated by the Crustal Dynamics Project office can be viewed by accessing the first menu item in the Reports sub-menu. These documents can be displayed at 80 or 132 column width. The schedules are updated as new reports are released by the Project office.

3.7.2 Current SLR Processing Status Reports

Monthly reports from Bendix on the status of MERIT laser data are available through Reports Menu Item 2. The information contained in these reports consists of the number of passes per station, their status of completion, and specific station problems. At the end of a report is a list of tape versions of data submitted to the DIS by Bendix. The report identifies the status of a particular month of laser data according to the latest released version on tape. Using this utility, the user will be presented with a list of files, each file containing a monthly report. The file name identifies the month, year and version of the status report, i.e., APR84A.STA in the April 1984 status report of the version A data. This report is updated on a weekly basis.

3.8 Screen Form Query Menu

A user accessing the DIS with a VT100 compatible device can view selected data sets through pre-programmed screen forms. The menu of these displays is shown in Figure 3-16. The screen form facility allows the user to query the ORACLE data base without constructing a formal SQL query. The user may retrieve data from a particular table through a fill-in-the-blanks screen. The VT100 keypad is used to query the data base and for cursor movement within the screen form. Figure 3-17 presents a diagram of the VT100 screen form definitions; Table 3-1 is a descriptive listing of the definitions. Figures of all screen forms accessible through Main Menu Item 8 are presented in the subsequent sections.

As an example, if the user wishes to retrieve rows from the data base where a selected field equals a particular value, the user may depress the ENTER QUERY key and fill in the appropriate blanks. The operator then retrieves the rows from the table satisfying the conditions by using the EXECUTE QUERY key. By depressing the NEXT RECORD key, the user may step through the returned rows. Helpful information about any enterable field may be viewed by pressing the HELP key.

Screen forms may display data from several distinct data base tables. This function requires the form to be divided into regions known as blocks, where each block corresponds to a table. One screen page may contain several blocks or one block may extend over several pages. To traverse from one block to another, the user should execute the NEXT BLOCK or PREVIOUS BLOCK commands.

****

R E P O R T S

1 -- Proposed Laser and VLBI System Schedules

2 -- Reports Displaying Current Laser Processing Status

3 -- Exit to Main DIS Menu

REP>Please enter your report selection

Figure 3-15. Reports Menu

```
********************************************************************************

                    S C R E E N   D I S P L A Y S   M E N U

              1 -- Occupancy and Survey Information Screen Form

              2 -- Crustal Dynamics Project Site Information Screen Form

              3 -- GSFC SLR Analyzed Information Screen Form

              4 -- GSFC VLBI Baselines and Experiment Information Screen Form

              5 -- JPL VLBI Baseline and Experiment Information Screen Form

              6 -- Lunar Laser Data Screen Form

              7 -- Polar Motion and Earth Rotation Screen Form

              8 -- Exit to main DIS MENU

SCR>Please enter your selection
```

Figure 3-16. Screen Form Query Menu

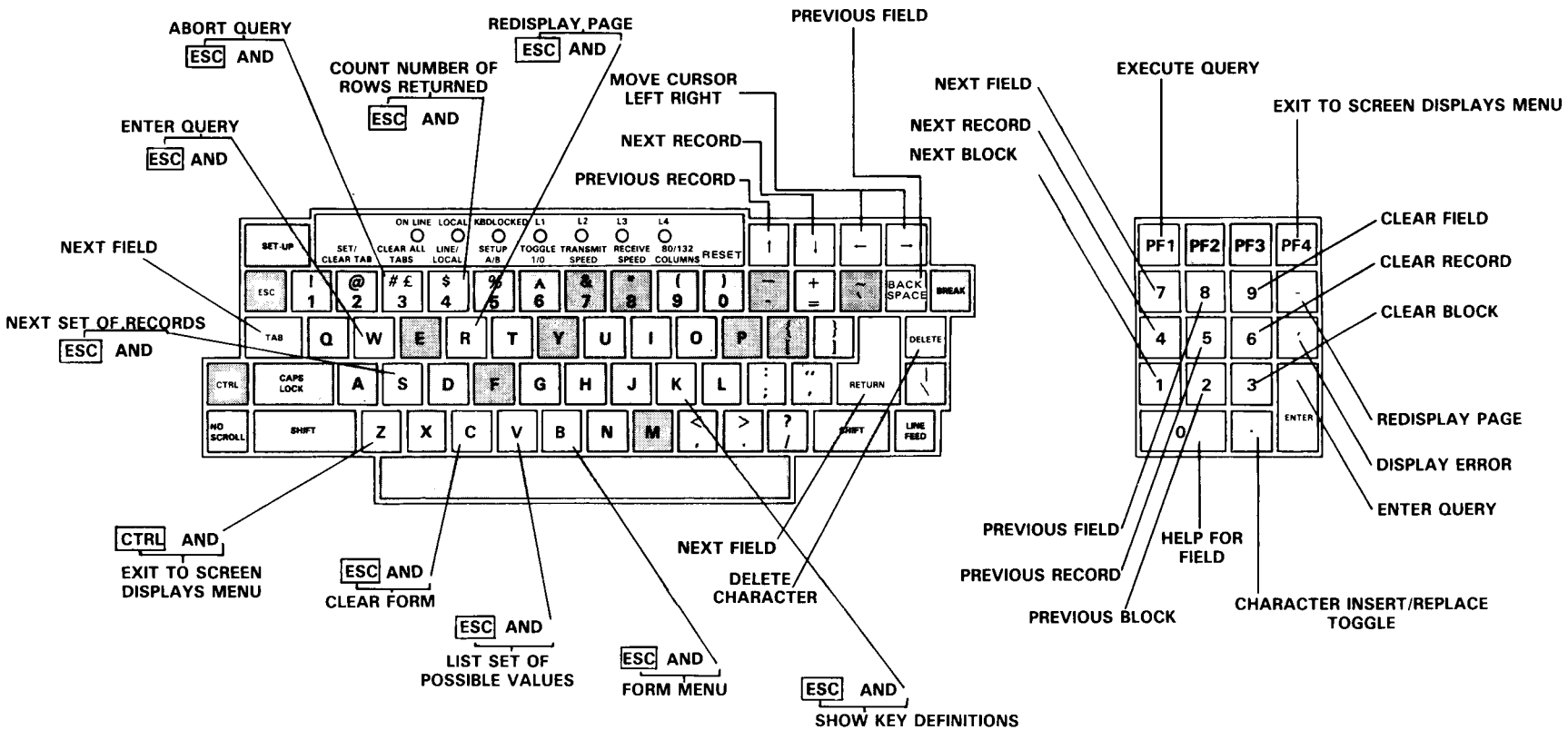

Figure 3-17. ORACLE Screen Form Keypad Key Definitions

Table 3-1

ORACLE Screen Form Key Definitions

Function	VT-100 Keystroke(s)
Enter query	<ENTER> or <ESC><W>
Execute query	<PF1>
Abort query	<ESC><3>
Next block	<1>
Next record	<4>
Next set of records	<ESC><S>
Next field	<CR> or <TAB> or <7>
Next primary key field	<ESC><TAB>
Previous block	<2>
Previous record	<5> or <UP ARROW>
Previous field	<BACKSPACE> or <8>
Clear form	<ESC><C>
Clear block	<3>
Clear record	<6>
Clear (end of) field	<9>
Move cursor left	<<- Arrow>
Move cursor right	<-> Arrow>
Delete character	<DELETE>
Char Insert/Replace	<.>
Help (field)	<0>
List of field values	<ESC><V>
Display error	<,>
Show function keys	<ESC><K>
Redisplay page	<ESC><R>
Count query hits	<ESC><4>
Menu	<ESC><B>
Exit to system	<PF4> or <CTRL><Z>

When a screen form is composed of multiple blocks, the user may enter the MENU command and select the number corresponding to the appropriate information. To exit from any screen display, the operator should enter the EXIT keystrokes.

Upon selection of a screen display, the user may optionally view a brief textual description of the form's contents. To read this information, the user should specify a "?"; to by-pass the text, the user should only press the RETURN key. The following sections will describe each Screen Form Query Menu item.

3.8.1 Occupancy and Survey Information Screen Form

Laser and VLBI occupation information, as well as laser coordinate and eccentricity information, is available through this four-paged screen form (Screen Form Query Menu Item 1) shown in Figure 3-18. Page one of the form displays the occupation histories of the various laser systems; page two displays the occupation's corresponding geodetic data; page three displays the occupation's eccentricity information; and page four displays the system occupation histories of the various VLBI systems.

3.8.2 Crustal Dynamics Project Site Information Screen Form

The laser and VLBI site information found in the Crustal Dynamics Project's site catalogue can be displayed using the screen display shown in Figure 3-19. This form (accessed through Screen Form Query Menu Item 2) consists of ten pages: pages one and two display descriptive information on the site; pages three and four display pertinent crew information; pages four and five display the corresponding crew information; pages six and seven display monument information for each station at the site; page eight displays the differential coordinate data between these monuments; page nine displays the occupational history of the monuments at the site; and page ten presents a list of site numbers versus site names. Since all previous pages require a site number rather than site name entry, this final page can be used to determine this numeric code when the site name is the only know entity.

3.8.3 GSFC SLR Analyzed Information Screen Form

The most recent SLR analyzed data submitted by GSFC's Laser Support Group can be accessed through the Screen Form Query Menu Item 3. The six-paged screen form is presented in Figure 3-20. Pages one and two of the display lists the yearly baseline solutions; pages three and four list the yearly polar motion solutions; and pages five and six list the year station position solutions. These baseline, polar motion, and station position determinations are stored as yearly tables in the data base. Therefore, to query data for each year, the user must enter the <NEXT BLOCK> keystrokes to move from one year to the next as well as between data type. Further information about the derivation of this solution can be obtained from the DIS HELP Facility (Main Menu Item 1).

3.8.4 GSFC VLBI Analyzed Information Screen Form

The revised VLBI analyzed data package submitted by GSFC's VLBI Support Group can be viewed by using the Screen Form Query Menu Item 4 display, shown

LASER STATION OCCUPATION INFORMATION

Station Number: ____
Project Site Number: ____
Location: _____

Name: _____
System: _____
Designator: _____

Occupation Dates: Starting: _____
Ending: _____

TWX: ____
Station Designator: ___
Tracker Identification: __
Comments: _____

If necessary, to determine a station number, depress keypad key 1 to advance to the next line and enter a query.

Station Number: ____ Location: _____

Char Mode: Replace Page 1 Count: *Ø

GEODETIC DATA

Station: ____
Location: _____

Geodetic location of survey tablet:
Latitude: _____
Longitude: _____
Datum: _____ Order of Accuracy: _____

Ellipsoid: _____
Elevation of Tablet: _____ meters above mean sea level
Datum: _____ Order of Accuracy: _____

Geoidal Height: _____ meters Reference: _____
Height of Survey Tablet above Ellipsoid: _____ meters

Geodetic Survey by: _____ Date: _____
Comments: _____
_____
_____

Char Mode: Replace Page 2 Count: *Ø

Figure 3-18. Occupancy and Survey Information Screen Form

CALIBRATION DATA

Station: ____ System Name: _____ System: _____
Station Designator: ___ Tracker I.D.: __ TWX: ____

Occupation eccentricities of laser mount in reference to survey tablet:
Direction: _____
Up: _____
References: Centers of rotation of elevation axis of mount in relation to punch hole of survey tablet
Boresight Data: Target Board: Slant Range _____ meters
Azimuth _____ degrees from north
Elevation Angle _____ degrees
Corner Cube: Slant Range _____ meters
Azimuth _____ degrees from north
Elevation Angle _____ degrees
References: Centerlines of elevation axis of laser mount and turning point of respective boresight
Calibration Survey by: _____ Date: _____
Comments: _____
_____
_____

Char Mode: Replace Page 3 Count: *Ø

VLBI STATION OCCUPATION INFORMATION

Station Number: ____
Project Site Number: ____
Location: _____

System: _____
Designator: _____

Occupation Dates: Starting: _____
Ending: _____

Comments: _____

If necessary, to determine a station number, depress keypad key 1 to advance to the next line and enter a query.

Station Number: ____ Location: _____

Char Mode: Replace Page 4 Count: *Ø

Figure 3-18. Occupancy and Survey Information Screen Form (Continued)

CRUSTAL DYNAMICS PROJECT -- GENERAL SITE INFORMATION

-- SCIENTIFIC INFORMATION --

Site Number: ____ Date: _____

Current Site Name: _____
Previous Site Name: _____

General Site Description: _____
_____
_____
_____
_____
_____
_____

No. of Observing Monuments: __

Site Topo Map: _____
_____
_____

Char Mode: Replace Page 1 Count: *Ø

-- GEOLOGICAL INFORMATION --

Geological Province: _____
_____
_____

Local Geology: _____
_____
_____
_____
_____

Primary Scientific Purposes: _____
_____
_____

Est. Stability of Monument: _____
_____

Surveyed into National Net? __ ([Y]es/[N]o)
Comments: _____
_____

Char Mode: Replace Page 2 Count: *Ø

Figure 3-19. Crustal Dynamics Project Site Information Screen Form

-- CREW INFORMATION --

Site Number: ____

Site/Monument Directions: _____

Access Road Condition: _____

Local Climate: _____

Char Mode: Replace Page 3 Count: *Ø

-- PAD INFORMATION --

Security of Site: _____

Ground Material: _____
Pad Material: _____
Largest Occupying System: _____

-- CONTACTS --

Site Number: ____
Owner: _____

Permitting Contact: _____

Caretaker: _____

Char Mode: Replace Page 4 Count: *Ø

Figure 3-19. Crustal Dynamics Project Site Information Screen Form (Continued)

-- AVAILABLE FACILITIES --

	Power	Phone
Type:		
Name of Company:		
Address:		
Telephone:		

Other Facilities Available: _____

Special Requirements: _____

Char Mode: Replace Page 5 Count: *Ø

CRUSTAL DYNAMICS PROJECT -- SITE MONUMENT INFORMATION

-- OBSERVING MONUMENT INFORMATION --

Site Number: ____ Monument Number: ____
Monument Inscription: _____
Systems Using Monument: _____
Type of Monument: _____

Site Name: _____
Previous Name: _____
Site Location: _____
Geographic Region: _____
Tectonic Plate: _____
Latitude: _____
Longitude: _____
Elevation Above MSL: _____ meters
Height Above Ellipsoid: _____ meters
Survey Source: _____ Reported: _____
Datum/Ellipsoid: _____
Comments: _____

Char Mode: Replace Page 6 Count: *Ø

Figure 3-19. Crustal Dynamics Project Site Information Screen Form (Continued)

-- REFERENCE MONUMENT INFORMATION --

Reference Source: _____

AZIMUTH POST

	1	2
Identity:	_____	_____
Azimuth:	_____	_____
Distance:	_____	_____

REFERENCE MONUMENT

	1	2	3	4
Identity:	_____	_____	_____	_____
Azimuth:	_____	_____	_____	_____
Distance:	_____	_____	_____	_____

Char Mode: Replace Page 7 Count: *Ø

DIFFERENTIAL COORDINATES

	Monument Number	Monument Inscription
From:	____	_____
To:	____	_____

	Differentials	Standard Errors
X	_____	_____
Y	_____	_____
Z	_____	_____
North	_____	_____
East	_____	_____
Up	_____	_____

Source: _____

Char Mode: Replace Page 8 Count: *Ø

Figure 3-19. Crustal Dynamics Project Site Information Screen Form (Continued)

-- SLR OCCUPATION INFORMATION OF MONUMENT --

Monument Number	Occupation Name	Occupying System	Occupation Designator	Occupation Dates
____	_____	_____	_____	Start _____
				End _____
____	_____	_____	_____	Start _____
				End _____
____	_____	_____	_____	Start _____
				End _____

-- VLBI OCCUPATION INFORMATION OF MONUMENT --

Monument Number	Occupying System	Occupation Designator	Occupation Dates
____	_____	_____	Start _____
			End _____
____	_____	_____	Start _____
			End _____
____	_____	_____	Start _____
			End _____

Char Mode: Replace Page 9 Count: *0

SITE NUMBER VERSUS SITE NAME

Site Number	Monument Number	Current Site Name
____	____	_____
____	____	_____
____	____	_____
____	____	_____
____	____	_____
____	____	_____
____	____	_____
____	____	_____
____	____	_____
____	____	_____
____	____	_____
____	____	_____
____	____	_____
____	____	_____
____	____	_____
____	____	_____

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Figure 3-19. Crustal Dynamics Project Site Information Screen Form (Continued)

GSFC SLR SL-7 Yearly Laser Baseline Determinations

Year	From Station	To Station	Distance (meters)		Sigma (meters)
1979	____	____	Baseline	_____	_____
			Ellipsoidal Chord	_____	_____
			Geodesic	_____	_____
1980	____	____	Baseline	_____	_____
			Ellipsoidal Chord	_____	_____
			Geodesic	_____	_____
1981	____	____	Baseline	_____	_____
			Ellipsoidal Chord	_____	_____
			Geodesic	_____	_____
1982	____	____	Baseline	_____	_____
			Ellipsoidal Chord	_____	_____
			Geodesic	_____	_____

Char Mode: Replace Page 1 Count: *0

GSFC SLR SL-7 Yearly Laser Baseline Determinations

Year	From Station	To Station	Distance (meters)		Sigma (meters)
1983	____	____	Baseline	_____	_____
			Ellipsoidal Chord	_____	_____
			Geodesic	_____	_____
1984	____	____	Baseline	_____	_____
			Ellipsoidal Chord	_____	_____
			Geodesic	_____	_____
1985	____	____	Baseline	_____	_____
			Ellipsoidal Chord	_____	_____
			Geodesic	_____	_____

Char Mode: Replace Page 2 Count: *0

Figure 3-20. GSFC SLR Analyzed Information Screen Form

GSFC SLR SL-6 Yearly Polar Motion Determinations

Year	Arc Date	Parameter		Values (arcseconds)	Cond. Number	Standard Deviation
1979	_____	_____	Original	_____	_____	_____
			Delta	_____		
			Update	_____		
1980	_____	_____	Original	_____	_____	_____
			Delta	_____		
			Update	_____		
1981	_____	_____	Original	_____	_____	_____
			Delta	_____		
			Update	_____		
1982	_____	_____	Original	_____	_____	_____
			Delta	_____		
			Update	_____		

Char Mode: Replace Page 3 Count: *0

GSFC SLR SL-6 Yearly Polar Motion Determinations

Year	Arc Date	Parameter		Values (arcseconds)	Cond. Number	Standard Deviation
1983	_____	_____	Original	_____	_____	_____
			Delta	_____		
			Update	_____		

Char Mode: Replace Page 4 Count: *0

Figure 3-20. GSFC SLR Analyzed Information Screen Form (Continued)

GSFC SLR SL-7 Yearly Updated Station Parameter Set

Year	Station Number		Geodetic Coordinates	Standard Deviations
1979	____	Latitude	_____	_____
		Longitude	_____	_____
		Height	_____	_____
1980	____	Latitude	_____	_____
		Longitude	_____	_____
		Height	_____	_____
1981	____	Latitude	_____	_____
		Longitude	_____	_____
		Height	_____	_____
1982	____	Latitude	_____	_____
		Longitude	_____	_____
		Height	_____	_____

NOTE: Significant values: AE = 6378137.00, 1/F = 298.257

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GSFC SLR SL-7 Yearly Updated Station Parameter Set

Year	Station Number		Geodetic Coordinates	Standard Deviations
1983	____	Latitude	_____	_____
		Longitude	_____	_____
		Height	_____	_____
1984	____	Latitude	_____	_____
		Longitude	_____	_____
		Height	_____	_____
1985	____	Latitude	_____	_____
		Longitude	_____	_____
		Height	_____	_____

NOTE: Significant values: AE = 6378137.00, 1/F = 298.257

Char Mode: Replace Page 6 Count: *0

Figure 3-20. GSFC SLR Analyzed Information Screen Form (Continued)

in Figure 3-21. This form consists of eight pages: page one lists the experiments reflected in the results; page two lists the a priori station coordinates; page three lists the radio source coordinates from the solution; page four lists the mobile station eccentricity vectors; page five lists the rectangular station position solutions; page six lists the baseline length determinations and their mean and slope values; page seven lists the VLBI earth orientation parameters; and page eight lists the nutation adjustments from the solution. The user is instructed to consult the DIS HELP Facility (Main Menu Item 1) for information concerning the processing history of the GSFC VLBI solution.

3.8.5 JPL VLBI Analyzed Information Screen Form

The latest VLBI analyzed data package submitted by JPL can be accessed through this seven-paged screen display (Screen Form Query Menu Item 5), presented in Figure 3-22. Page one displays the JPL experiment history; page two displays the a priori station locations; page three displays the mobile VLBI station eccentricities; page four displays the a priori source coordinates; page five displays the baseline determinations and their components; page six displays the solved-for station locations and covariances; and page seven displays a table of UT1 values. As with any analyzed solution, the user should read the processing information found in the DIS HELP Facility (Main Menu Item 1).

3.8.6 Lunar Laser Data Screen Form

By selecting Screen Form Query Menu Item 6, the user can access the catalogues of lunar laser data received from the University of Texas. This display, shown in Figure 3-23, consists of two pages: the first page presents the Z card or ancillary lunar laser data; the second page presents the N card or normal point lunar laser data. For further information on the processing of this lunar laser data, the user should consult the DIS HELP Facility (Main Menu Item 1).

3.8.7 Polar Motion and Earth Rotation Screen Form

The DIS has received polar motion and earth rotation solutions from many global institutions. Many of these data sets can be accessed through Screen Form Query Menu Item 7. This screen display (shown in Figure 3-24) consists of seven pages: pages one through four list the yearly polar motion solutions from quick-look data as computed by the University of Texas; page five lists the MIT COM14 earth rotation results computed from BIH, LLR, SLR, NGS VLBI, GSFC VLBI, and JPL VLBI measurements; page six lists raw values of UT1 from lunar laser ranging data as submitted by JPL; and page seven lists earth rotation from lunar laser ranging data as submitted by JPL. The user should consult the DIS HELP Facility (Main Menu Item 1) for more information on these data sets.

3.9 Exit and Sign Off

Specifying Main Menu Item 9 will cause the user to exit the DIS and be automatically disconnected from the computer.

Summary of GSFC VLBI Experiments

Date	Site	Purpose	Data Base	Reference Station?

A Reference Station is a station with coordinates fixed for a given experiment the stations as arc parameters solution, GLB027.

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GSFC VLBI Station Coordinates

Site		Component (meters)	Formal Error	Solution
	X			
	Y			
	Z			
	X			
	Y			
	Z			
	X			
	Y			
	Z			

Note: The terrestrial reference frame is fixed by the adopted value of the coordinates of HAYSTACK given above and the BIH Circular D earth orientation parameters of the reference dat 17-Oct-80 modified by the MERIT standard UT1 tidal model.

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Figure 3-21. GSFC VLBI Analyzed Information Screen Form

GSFC VLBI Radio Source Coordinates from Global Solution S284C

Source Name	Right Ascension Value (Hr Mn Sec)	Sigma	Declination Value (Deg Mn Sec)	Sigma

Note: The right ascension of the GSFC VLBI celestial reference frame is fixed by the adopted given value of the right ascension of 3C273B.

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Eccentricity Information For GSFC VLBI Data
Vector from Monument to Mobile VLBI Reference Point

Date	Sta.	Site Name	--- Components (meters) --- East	North	Vertical	Data Base

Note: Except for 85AUG28X, all values are taken from eccentricity file "ECCDAT" maintained by the National Geodetic Survey. The values for Platteville for 85AUG28X were assumed to be identical to those for 85SEPØ4X.

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Figure 3-21. GSFC VLBI Analyzed Information Screen Form (Continued)

GSFC VLBI Rectangular Positions

Site Name	Date	Components (m)	Sigmas (m)
_____	_____	X _____	X _____
		Y _____	Y _____
		Z _____	Z _____
_____	_____	X _____	X _____
		Y _____	Y _____
		Z _____	Z _____
_____	_____	X _____	X _____
		Y _____	Y _____
		Z _____	Z _____
_____	_____	X _____	X _____
		Y _____	Y _____
		Z _____	Z _____

Char Mode: Replace Page 5 Count: *Ø

GSFC VLBI Baseline Length Evolution

Date	From Site	To Site	Length (cm)	Error (cm)	# Observations Weight.	Total
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

Summary Information for GSFC VLBI Baseline Determinations

From VLBI Site at _____ to VLBI Site at _____

Mean: _____ +/- _____ cm (scaled 1 sig)
Weighted RMS Scatter about Mean: _____ cm
Slope: _____ cm/yr (scaled 1 sig)
Weighted RMS Scatter about Line: _____ cm

Note: An * denotes use of the WESTFORD antenna in the experiment. The results where mapped to the HAYSTACK antenna.

Char Mode: Replace Page 6 Count: *Ø

Figure 3-21. GSFC VLBI Analyzed Information Screen Form (Continued)

GSFC VLBI Orientation

Date	Values			Formal Errors			Correlations		
	X-Pole	Y-Pole	UT1-TAI	X	Y	UT1	X-Y	X-U	Y-U

Note: Units are 0.0001 seconds for x- and y- pole; 0.00001 seconds for UT1.

Char Mode: Replace Page 7 Count: *0

Nutation Adjustments from GLB027 GSFC VLBI Solution

Date	Nutation in Longitude (milliarcseconds)		Nutation in Obliquity (milliarcseconds)	
	Value	Error	Value	Error

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Figure 3-21. GSFC VLBI Analyzed Information Screen Form (Continued)

MARK III ARIES MOBILE VLBI EXPERIMENTS -- CURRENT VLBI DATA BASE

Experiment	Date	Site	System	Trop. Calib.	Obs. Freq.

Water Vapor Calibrated by:
W = Water Vapor Radiometer
S = Surface Meterology Data
H = Solar Hygrometer
Q = Water Vapor Radiometer and Surface Meteorology Data

Char Mode: Replace Page 1 Count: *0

A PRIORI STATION LOCATIONS -- MOBILE VLBI MARK III DATA TRANSFER

Site	Radius off Spin Axis	East Longitude	Height Above Equator	Axis Offset	Ant. Type

OVRO 130 is the origin of coordinates for most mobile VLBI experiments. Its geocetric position given above may differ by up to two meters from the true mean geocentric value. The orientation of the coordinate system is determined by the values of UT1-UTC and polar motion.

Char Mode: Replace Page 2 Count: *0

Figure 3-22. JPL VLBI Analyzed Information Screen Form

TRANSPORTABLE ANTENNA SITE VECTORS -- MOBILE VLBI MARK III DATA TRANSFER

Expt.	Date	Site	Site Vector Components (m) East	North	Vertical	Mobile Unit	Occupation Designator

The vector is measured from the reference point on the survey mark to the intersection of the antenna axes.

During experiment 801X, two Mark II recorders ran in parallel, one with a 40 Mhz channel separation, another with an 80 Mhz channel separation. This resulted in two independent baseline measurements.

*A Indicates this MV-3 site vector was determined by reconstruction of the encoder readings on the locator arm after calibrations were performed.

*O Indicates this MV-3 site vector was determined by an optical survey which was performed and initially reduced during the occupation.

Char Mode: Replace Page 3 Count: *0

A PRIORI SOURCE COORDINATES -- MOBLIE VLBI MARK III DATA TRANSFER

Source	Right Ascension (Hr Min Sec)	Declination (Hr Min Sec)	Uncertainties R. A.	Dec.

No observations of the source 3C 418 were contained in the data set from which the above source catalogue is derived. The coordinates for 3C 418 were taken from several individual solutions. It is presented here with a large uncertainty and is a priori unconstrained in the global solution.

Char Mode: Replace Page 4 Count: *0

Figure 3-22. JPL VLBI Analyzed Information Screen Form (Continued)

JPL BASELINE DETERMINATIONS -- MOBILE VLBI MARK III DATA TRANSFER

Expt.	Dates DD-Mon-YY	Dates MJD	From Mobile VLBI Site At	To Mobile VLBI Site At	Distance (meters)

BASELINE COMPONENTS

Expt.	From Mobile VLBI Site At	To Mobile VLBI Site At	Components (meters)		Correlations (meters**2)	
			X		XY	
			Y		XZ	
			Z		YZ	

Char Mode: Replace Page 5 Count: *Ø

STATION LOCATIONS AND COVARIANCES IN CIO CARTESIAN SYSTEM

Site	Date	Hours	Components (meters)		Correlations (meters**2)	
			X		XY	
			Y		XZ	
			Z		YZ	
			X		XY	
			Y		XZ	
			Z		YZ	
			X		XY	
			Y		XZ	
			Z		YZ	
			X		XY	
			Y		XZ	
			Z		YZ	

The coordinates of OVRO 13Ø are held fixed at the position given for all experiments.

Char Mode: Replace Page 6 Count: *Ø

Figure 3-22. JPL VLBI Analyzed Information Screen Form (Continued)

TABLE OF UT1 VALUES

Experiment	Date	Hours	Difference from BIH Circular D (Mobile VLBI - BIH)		
____	_____	__	UT1	_____	seconds
			PM(X)	_____	arc seconds
			PM(Y)	_____	arc seconds
____	_____	__	UT1	_____	seconds
			PM(X)	_____	arc seconds
			PM(Y)	_____	arc seconds
____	_____	__	UT1	_____	seconds
			PM(X)	_____	arc seconds
			PM(Y)	_____	arc seconds
____	_____	__	UT1	_____	seconds
			PM(X)	_____	arc seconds
			PM(Y)	_____	arc seconds

Char Mode: Replace Page 7 Count: *Ø

Figure 3-22. JPL VLBI Analyzed Information Screen Form (Continued)

LUNAR LASER DATA
ANCILLARY INFORMATION

Observatory Code: ____ Dates: Calendar: _____
Julien: _____

Clock Epoch Offset: _____ (msec) Dark Count: ____ kHz
Temperature: ____ celcius Moon Count: ____ kHz
Humidity: ___ % saturation Star Count: ____ kHz
Wind Speed: ____ km/hr Star Identification: _____

Seeing: _____ arc sec Laser Frequency: _____ 10 gHz
Accuracy Code: ____ Pulse Length: ___ 100 psec
Energy: _____ 0.1 joule Resolution: _____ 100 psec

Spectral Filter Width: ____ 0.1 angstrom Number of Shots: _____
Spatial Filter Width: ____ 0.1 arc sec

Char Mode: Replace Page 1 Count: *0

LUNAR LASER DATA
NORMAL POINT INFORMATION

Body Identifier: ____
Observatory Code: _____ Calendar Date: _____
Reflector Code: __ Observation Epoch: _____
Observation Type: __ Epoch Time Base: ___

Observed Time Delay: _____ 100 psec Electronic Delay: _____ 100 psec
Uncertainty Estimate: _____ 100 psec Geometric Delay: _____ 100 psec

Number of Photon Stops in a Normal Point: ____

Frequency Offset: _____ parts in 10**11 (subtract effect from range)

Delay Time Base: ___ Atmospheric Pressure: _____ 0.1 mb

Char Mode: Replace Page 2 Count: *0

Figure 3-23. Lunar Laser Data Screen Form

UNIVERSITY OF TEXAS POLAR MOTION SOLUTIONS FROM QUICK-LOOK DATA
RAW VALUES FOR 1986

Arc Number: ___
Arc Date: _____
MJD: _____

Mean Observation Time: ____
Number of Observing Stations in Arc: ____

Components		Standard Errors		Correlation Coefficients		
X Pole:	_____	____	(0.0001 arc sec)	X-Y:	____	(0.01)
Y Pole:	_____	____	(0.0001 arc sec)	X-Duration:	____	(0.01)
Duration:	____	____	(0.00001 arc sec)	Y-Duration:	____	(0.01)

Char Mode: Replace Page 1 Count: *0

UNIVERSITY OF TEXAS POLAR MOTION SOLUTIONS FROM QUICK-LOOK DATA
RAW VALUES FOR 1985

Arc Number: ___
Arc Date _____
MJD: _____ (0.001 D)

Standard Deviation of the Solution: _____ (0.0001 seconds)
Number of Observing Stations in Arc: ____
Number of Observations in Arc: ____
Computing Center Code: ___
Preliminary Solution? _

Components		Standard Errors		Correlation Coefficients		
X Pole:	_____	____	(0.0001 arc sec)	X-Y:	____	(0.01)
Y Pole:	_____	____	(0.0001 arc sec)	X-Duration:	____	(0.01)
Duration:	____	____	(0.00001 arc sec)	Y-Duration:	____	(0.01)

Char Mode: Replace Page 2 Count: *0

Figure 3-24. Polar Motion and Earth Rotation Screen Form

UNIVERSITY OF TEXAS POLAR MOTION SOLUTIONS FROM QUICK-LOOK DATA
RAW VALUES FOR 1984

Arc Number: ___
Arc Date _____
MJD: _____ (0.001 D)

Standard Deviation of the Solution: _____ (0.0001 seconds)
Number of Observing Stations in Arc: ____
Number of Observations in Arc: ____
Computing Center Code: ___

Components	Standard Errors		Correlation Coefficients	
X Pole: _____	____	(0.0001 arc sec)	X-Y: ____	(0.01)
Y Pole: _____	____	(0.0001 arc sec)	X-Duration: ____	(0.01)
Duration: ____	____	(0.00001 arc sec)	Y-Duration: ____	(0.01)

Char Mode: Replace Page 3 Count: *0

UNIVERSITY OF TEXAS POLAR MOTION SOLUTIONS FROM QUICK-LOOK DATA
RAW VALUES FOR 1983

Arc Number: ___
Arc Date _____
MJD: _____ (0.001 D)

Standard Deviation of the Solution: _____ (0.0001 seconds)
Number of Observing Stations in Arc: ____
Number of Observations in Arc: ____
Computing Center Code: ___

Components	Standard Errors		Correlation Coefficients	
X Pole: _____	____	(0.0001 arc sec)	X-Y: ____	(0.01)
Y Pole: _____	____	(0.0001 arc sec)	X-Duration: ____	(0.01)
Duration: ____	____	(0.00001 arc sec)	Y-Duration: ____	(0.01)

Char Mode: Replace Page 4 Count: *0

Figure 3-24. Polar Motion and Earth Rotation Screen Form (Continued)

MIT COM14 Earth Rotation Results Computed from
BIH, LLR, SLR, NGS VLBI, GSFC VLBI, and JPL VLBI Measurements

Date	MJD	TAI-UT1 (ms)	Uncertainty (ms)

Char Mode: Replace Page 5 Count: *0

Raw Values of UT1 from Lunar Laser Ranging Data Submitted by JPL

Date	MJD	UT1-UTC (seconds)	Formal Error (seconds)

Char Mode: Replace Page 6 Count: *0

Figure 3-24. Polar Motion and Earth Rotation Screen Form (Continued)

Earth Rotation from Lunar Laser Ranging Data Submitted by JPL

Date	MJD		Values		Formal Errors	
________	_____	Fourier Smoothed	________	sec	________	sec
		15-Day Gauss	________	sec	________	sec
		10-Day Gauss	________	sec	________	sec
		PHI	________	arcsec	________	arcsec
________	_____	Fourier Smoothed	________	sec	________	sec
		15-Day Gauss	________	sec	________	sec
		10-Day Gauss	________	sec	________	sec
		PHI	________	arcsec	________	arcsec
________	_____	Fourier Smoothed	________	sec	________	sec
		15-Day Gauss	________	sec	________	sec
		10-Day Gauss	________	sec	________	sec
		PHI	________	arcsec	________	arcsec

NOTE: An * indicates the ten day Gaussian smoothing is not supported here because of a data gap; the BIH value is reported.

Char Mode: Replace Page 7 Count: *0

Figure 3-24. Polar Motion and Earth Rotation Screen Form (Continued)

4. Requesting Data

A chief mission of the Crustal Dynamics Data Information System and it's staff is the dissemination of geodetic data. Throughout this guide, various forms of data available to users through the online DIS have been exhibited. If, however, the user requires the data to be distributed in hardcopy form, the staff will accommodate this request. To acquire data from the DIS, the user should submit a written request to the staff. A form shown in Figure 4-1 is available for requesting data; however, any written format will be sufficient as long as enough information is forwarded concerning the desired data and format. To process a request, the staff needs specific information concerning the user, i.e., the user's name, address, phone number, and network information (if any). The data will be sent to this address. The user should indicate the type (SLR, VLBI, SITE, and OTHER) and dates (e.g., MARCH 1982-APRIL 1983) of the data desired. The user should describe the specific data required, for example, TEXAS LUNAR LASER DATA. The output format for the data also needs to be specified. In general, users are interested in data on hardcopy reports or on magnetic media (9-Track tape or IBM DOS-formatted 5-1/4 inch floppy). If magnetic media is desired, the user must specify the characteristics, i.e., density and format. If the criteria provided in the form shown in Figure 4-1 do not conform to the user's specifications, explain what is needed in the "SPECIFY" section of the form. The request can be sent by postal service or mailed through one of the computer networks available to the DIS staff (see Section 2.5.2). Requests will be attended to as soon as possible. For information on the status of a user request, please call the DIS staff directly.

5. Future Plans for the DIS

In 1985 the DEC VAX 11/780 computer supporting the DIS became part of the National Space Science Data Center (NSSDC) and was required to support an increasing number of activities. This overload on the limited resources of the 11/780 has resulted in decreased service at certain times of the day to the Crustal Dynamics Project investigator community. Therefore, the DIS plans to procure a smaller computer, a DEC MicroVAX II, to remove the majority of its operational requirements to a dedicated system. This new environment will have to run on a machine which also operates under VMS and can utilize the ORACLE DBMS. The DIS plans to procure the specified MicroVAX system to satisfy the compatibility with the current VAX 11/780-based system thus ensuring easy conversion of existing software to the MicroVAX. The transfer of the DIS from the overloaded VAX 11/780 environment to the proposed dedicated MicroVAX environment will ensure that the investigator community will have consistent, rapid access to the facility at all times. To satisfy users in different time zones, the DIS in the MicroVAX environment will be accessible to the investigator community 24 hours a day, 7 days a week.

In addition, the user interface of the DIS will be slightly modified upon transfer of the software to the dedicated computer. The currently available menu items will continue; however, features will be implemented to provide users easier access to these items (e.g., new screen forms for display of NGS VLBI analyzed results, SLR catalogues and pass information, etc.). At this time, a new, more detailed users guide to the DIS will be issued. Meanwhile, the DIS will continue to publish the DIS Bulletin on a bi-monthly basis and will include any articles to apprise users of changes to the system. Users not receiving these documents should contact the DIS staff to be added to the bulletin distribution list.

CRUSTAL DYNAMICS DATA INFORMATION SYSTEM
REQUEST FORM

DATE: _____

NAME: _____

PHONE: _____ NETWORK: _____

ADDRESS: _____

_____

_____

_____

DATA REQUIRED: SLR VLBI SITE OTHER

DATES: _____

SPECIFY: _____

_____

_____

_____

_____

REPORT FORMAT REQUIRED: Y/N IBM DOS 5-1/4" FLOPPY FORMAT REQUIRED: Y/N

TAPE FORMAT REQUIRED: Y/N

BPI: 800 1600 6250

FORMAT: ASCII EBCDIC

SEND TO: Henry G. Linder, Data Manager
Crustal Dynamics Data Information System
Code 634
Goddard Space Flight Center
Greenbelt, Maryland
20771

Figure 4-1. DIS Data Request Form

6. Bibliography

1. Coates, Robert J., Herbert Frey, Gilbert D. Mead, and John M. Bosworth. "Space-Age Geodesy: The NASA Crustal Dynamics Project". IEEE Transactions on Geoscience and Remote Sensing, Vol. GE-23, No. 4. July, 1985.

2. "Global Geodynamics". Geodynamics Program Office, NASA Headquarters.

3. Linder, Henry G. Data Management Plan for Crustal Dynamics Project. NASA/GSFC X-931-81-18. July, 1981.

4. Linder, Henry G. and Carey E. Noll. Crustal Dynamics Data Information System User's Guide. NASA/GSFC X-931-82-14. October, 1982.

5. Ma, Choppo and J. W. Ryan. Crustal Dynamics Project Data Analysis -- 1986. NASA/GSFC TM 87806. September, 1986.

6. NASA Execution Phase Project Plan for Crustal Dynamics. NASA/GSFC. September, 1981.

7. Noll, Carey E. The Development of Selected Data Base Applications for the Crustal Dynamics Data Information System. NASA/GSFC TM 83886. December, 1981.

8. ORACLE Quick Reference, Version 4.0. ORACLE Corporation. July, 1984.

9. ORACLE SQL/UFI Reference Manual, Version 4.0. ORACLE Corporation. June, 1984.

Appendix A. SQL Query Examples

A.1. ORACLE Query Language

As discussed in Section 3.2 of this guide, the user can execute a number of pre-programmed queries by simply entering an "@" sign followed by the name of the query. However, the command procedures found in the UFI menus are very general and typically will list out the contents of an entire table. The user may wish to constrain these results; i.e., only display a few columns and a few rows of the table. This appendix will provide instruction on the modification of the pre-designed queries as well as hints on constructing new procedures. For further instruction on using the SQL language as well as the UFI capabilities, contact the DIS staff for a copy of the guide "ORACLE's SQL Query Language for Use in the DIS".

ORACLE's query language can be divided into two parts: the SQL query language which allows the user to retrieve information from the data base, and the UFI command language which allows the user to access the data base, format the results of the SQL query, save the SQL query and/or its results, and obtain help text on both SQL and UFI itself. This appendix presents instruction and examples in the construction of SQL queries.

Several conventions should be followed when creating and executing queries within this data base. First, any string (i.e., character or character mixed with numeric digits) must be enter within single quotes (e.g., 'GREENBELT', 'N 23.4'). To determine the fields and their respective data types, enter DESC tname following the UFI> prompt, where tname is the name of the table of interest. Second, all character strings (with the exception of the data dictionary descriptions) are stored in upper case letters; the data base management system is case sensitive therefore all query specifications for character data should use upper case letters only. Third, the default format for DATE data type fields is DD-MON-YY, where "DD" is the numeric day of the month (e.g., 01, 22), "MON" is the upper case, three-character month abbreviation (e.g., JAN, SEP), and "YY" is the two digit, numeric year (e.g., 77, 85). All specifications in a WHERE clause for DATE data type fields should also be entered within single quotes (e.g., WHERE OBS_DATE = '09-SEP-77').

A.1.1. SQL Language Data Retrieval Statements

Data retrieval from the ORACLE data base is achieved with various forms of the SELECT SQL statement. The syntax for the SELECT statement is:

```
SELECT [DISTINCT] columns(s)
FROM table(s)
[WHERE clause]
[GROUP BY clause [HAVING clause]]
[ORDER BY clause]
```

A SELECT statement with its various additional clauses is known as a Query Block. A query block must at least contain a SELECT clause and a FROM clause. The order of these clauses is important; they must appear in the order specified above. However, they do not need to appear on separate lines.

Briefly, the functions of these clauses are as follows:

SELECT	specifies the column(s) to be displayed in the query
FROM	specifies the table(s) to be accessed in the query
WHERE	specifies the qualifications that must be met by rows returned from the selected table
GROUP BY	groups reported rows by the specified fields
HAVING	specifies the search condition on GROUP rows as opposed to the search condition on individual rows specified in the WHERE clause
ORDER BY	defines the ordering of the retrieved rows

Following construction, there are two ways to execute a valid SQL query: 1.) by entering a slash (/) as the first character after the last line of the query; or 2.) by placing a semi-colon (;) at the end of the last clause of the query block.

A.1.2. UFI Commands

UFI commands are non-SQL commands used to establish and modify the Query Block as well as the format of its results. These commands can be entered at any time directly following the "UFI>" prompt. In other words, a UFI command to list the current SQL statement can be issued after a queries execution without modifying the actual query itself. However, if another SQL command (e.g., SELECT) is entered, the new statement will become the current query.

At any time during a UFI session, the user may display certain characteristics of accessible data base tables with the DESC[RIBE] command. By entering DESC tname, where "tname" is the name of a valid data base table, the internal size, display size for numeric variables, data type (number, char[acter], or date), and the name can be displayed for each column of the specified table. This function is extremely helpful when the user wants to modify an existing procedure or create a new query.

A.2. Modifying SQL Queries

After the user has selected a query from one of the SQL query sub-menus (see Section 3.2), the user can execute the query by entering "@QNAME" following the "UFI>" prompt, where QNAME is the name of the SQL query. The command will automatically be executed and the corresponding results displayed. However, the user may want to modify this query in order to display a subset of the table's columns and/or rows.

As an example, a user has executed one of the procedures listed in the Baseline Query Menu (Interactive Data Base Management System Menu Item 2) to display GSFC VLBI data. The interaction with the BASELINE_VLBIGSFC data base table is illustrated in Figure A-1. However, the user may not wish to view all columns or rows contained in this table; he may merely wish to display data for a particular station or site name. In order to modify the existing query after its execution, the user should enter the LIST command following the UFI> prompt. This entry, shown in Figure A-2, will cause the current query (the baseline query) to be displayed on the screen. The user may now use UFI commands to modify the columns displayed in the query or limit the number of

```
UFI> @BLVG
UFI> SET ECHO OFF
DOC>*****   BLVG
DOC>
DOC>      Display all baseline information from the GSFC VLBI baseline data table
DOC>      (BASELINE_VLBIGSFC)
DOC>
DOC>      The following are the associated column definitions and units:
DOC>
DOC>           From Site -- VLBI "from" site name (an * indicates Westford results
DOC>                        were mapped to Haystack)
DOC>           To Site -- VLBI "to" site name
DOC>           Obs. Date -- Experiment date
DOC>           Distance -- Baseline distance (cm)
DOC>           Error -- Formal error on baseline determination (cm)
DOC>           Weight!Obs. -- Number of weighted observations
DOC>           Total!Obs. -- Number of total observations
DOC>#

<RETURN> to continue
```

Obs. Date	From Site	To Site	Baseline Distance	Error	Weight Obs	Total Obs
03-AUG-79	HAYSTACK	NRAO 140	84512987.0	0.7	179	190
03-AUG-79	HAYSTACK	OVRO 130	392888165.4	1.2	146	173
03-AUG-79	NRAO 140	OVRO 130	332424415.9	1.3	144	162
25-NOV-79	EFLSBERG	HAYSTACK	559190352.2	2.5	30	35
25-NOV-79	EFLSBERG	NRAO 140	633464843.2	2.9	35	37
25-NOV-79	EFLSBERG	OVRO 130	820374246.3	3.1	32	37
25-NOV-79	HAYSTACK	NRAO 140	84512982.9	0.8	73	78
25-NOV-79	HAYSTACK	OVRO 130	392888162.0	1.7	59	68
25-NOV-79	NRAO 140	OVRO 130	332424420.2	1.7	71	76
11-APR-80	HAYSTACK	HRAS 085	313564101.4	1.1	194	216
11-APR-80	HAYSTACK	NRAO 140	84512985.3	0.3	207	216
11-APR-80	HAYSTACK	OVRO 130	392888164.4	0.5	211	220
11-APR-80	HRAS 085	NRAO 140	235463400.9	0.9	196	210
11-APR-80	HRAS 085	OVRO 130	150819536.9	0.6	195	221
11-APR-80	NRAO 140	OVRO 130	332424419.9	0.5	208	214
26-JUL-80	EFLSBERG	HAYSTACK	559190368.4	1.5	131	139
26-JUL-80	EFLSBERG	HRAS 085	808418494.2	3.3	124	130
26-JUL-80	EFLSBERG	ONSALA60	83221052.6	0.9	115	142
26-JUL-80	EFLSBERG	OVRO 130	820374261.9	2.3	107	124
26-JUL-80	HAYSTACK	HRAS 085	313564103.9	1.4	124	139

```
<RETURN> to continue
```

```
<RETURN> to continue
```

Obs. Date	From Site	To Site	Baseline Distance	Error	Weight Obs	Total Obs
29-DEC-85	HAYSTACK *	HRAS 085	313564098.9	0.8	75	86
29-DEC-85	HAYSTACK *	WETTZELL	599739072.5	1.1	73	92
29-DEC-85	HRAS 085	WESTFORD	313492800.0	0.8	75	86
29-DEC-85	HRAS 085	WETTZELL	841756153.5	2.3	44	51
29-DEC-85	WESTFORD	WETTZELL	599832536.4	1.1	73	92

```
2225 records selected.
```

Figure A-1. Pre-Programmed SQL Query Execution Example

```
UFI>
UFI> LIST
  1  SELECT OBS_DATE,FROM_SITE,TO_SITE,DISTANCE,ERR,WEIGHTED_OBS,TOTAL_OBS
  2  FROM BASELINE_VLBIGSFC
  3* ORDER BY OBS_DATE,FROM_SITE,TO_SITE
UFI> L1
  1* SELECT OBS_DATE,FROM_SITE,TO_SITE,DISTANCE,ERR,WEIGHTED_OBS,TOTAL_OBS
UFI> L2
  2* FROM BASELINE_VLBIGSFC
UFI> I
  3i WHERE FROM_SITE = 'CHLBOLTN' OR TO_SITE = 'CHLBOLTN'
  4i
UFI> LIST
  1  SELECT OBS_DATE,FROM_SITE,TO_SITE,DISTANCE,ERR,WEIGHTED_OBS,TOTAL_OBS
  2  FROM BASELINE_VLBIGSFC
  3  WHERE FROM_SITE = 'CHLBOLTN' OR TO_SITE = 'CHLBOLTN'
  4* ORDER BY OBS_DATE,FROM_SITE,TO_SITE
UFI> /

<RETURN> to continue
```

Obs. Date	From Site	To Site	Baseline Distance	Error	Weight Obs	Total Obs
16-OCT-80	CHLBOLTN	HAYSTACK	507231449.9	1.1	89	99
16-OCT-80	CHLBOLTN	HRAS 085	766373734.5	2.8	53	71
16-OCT-80	CHLBOLTN	ONSALA60	110986432.4	0.7	93	99
16-OCT-80	CHLBOLTN	OVRO 130	784699126.0	2.0	53	62
17-OCT-80	CHLBOLTN	HAYSTACK	507231445.3	1.4	90	111
17-OCT-80	CHLBOLTN	HRAS 085	766373747.2	3.2	61	77
17-OCT-80	CHLBOLTN	ONSALA60	110986435.1	1.1	67	112
17-OCT-80	CHLBOLTN	OVRO 130	784699129.9	2.5	32	44
18-OCT-80	CHLBOLTN	HAYSTACK	507231450.2	1.6	86	97
18-OCT-80	CHLBOLTN	HRAS 085	766373746.3	3.9	51	66
18-OCT-80	CHLBOLTN	ONSALA60	110986431.9	2.1	2	97
18-OCT-80	CHLBOLTN	OVRO 130	784699131.4	3.0	62	74
19-OCT-80	CHLBOLTN	HAYSTACK	507231445.9	0.9	97	107
19-OCT-80	CHLBOLTN	HRAS 085	766373731.0	2.6	54	66
19-OCT-80	CHLBOLTN	ONSALA60	110986432.1	0.6	79	88
19-OCT-80	CHLBOLTN	OVRO 130	784699128.8	4.5	38	76
20-OCT-80	CHLBOLTN	HAYSTACK	507231447.4	1.3	84	108
20-OCT-80	CHLBOLTN	HRAS 085	766373741.3	2.9	59	70
20-OCT-80	CHLBOLTN	ONSALA60	110986432.6	0.9	104	113
20-OCT-80	CHLBOLTN	OVRO 130	784699131.5	2.3	82	85

```
<RETURN> to continue
```

Obs. Date	From Site	To Site	Baseline Distance	Error	Weight Obs	Total Obs
21-OCT-80	CHLBOLTN	HAYSTACK	507231435.3	2.0	82	96
21-OCT-80	CHLBOLTN	HRAS 085	766373719.3	3.9	58	76
21-OCT-80	CHLBOLTN	ONSALA60	110986431.0	1.5	92	99
21-OCT-80	CHLBOLTN	OVRO 130	784699108.3	3.3	71	83
22-OCT-80	CHLBOLTN	HAYSTACK	507231445.7	0.9	100	110
22-OCT-80	CHLBOLTN	HRAS 085	766373738.7	2.1	58	73
22-OCT-80	CHLBOLTN	ONSALA60	110986433.1	0.6	102	113
22-OCT-80	CHLBOLTN	OVRO 130	784699125.0	1.8	74	85

```
28 records selected.
```

Figure A-2. SQL Query Modification Example (Part I)

rows displayed from the query by specifying a particular site name or by specifying a date range. This alteration methodology is the same in either case: after the user has listed the entire query, he may then modify the current line or another line of the query by entering L[INE]# after the UFI> prompt, where "#" is the number displayed to the left of each query line (e.g., L3 to display the third line of the query block).

In addition, he may add a line after the current line by entering I[NPUT] following the UFI> prompt (see Figure A-2) or remove the current line by entering DEL[ETE]. For example, the user may wish to display data for a particular site only. Thus, he inserts a line for the WHERE clause, directly following the FROM clause, to specify a particular FROM_SITE and TO_SITE name (see Figure A-2). Alternatively, a wild card symbol can be used within a character string coupled with the LIKE operator (instead of the "=" operator). This character pattern matching is illustrated in Figure A-3 which retrieves all rows where the FROM_SITE or TO_SITE name begins with the letter "K".

To alter a string within a line, the user should enter C[HANGE]/str1/str2/ to modify "str1" to "str2" (e.g., C/WEIGHTED_OBS,// to remove the display of the column WEIGHT_OBS). Figure A-3 shows this type of modification to the WHERE clause.

Finally, to execute the modified query, the user should enter R[UN] or a "/" directly following the UFI> prompt.

A.3 DIS Data Dictionary

The DIS "data dictionary" describes each DIS data base table and its respective columns and, where applicable, the units associated with the data items. This function is an extension of the DESC[RIBE] command discussed in Section A.1.2. When a new data set is implemented in the DIS data base, these dictionary tables are updated to reflect the added information.

The two tables which define this data dictionary are TABLE_INFO (having two columns, TABLE_NAME and TABLE_DESCRIPTION) and COLUMN_INFO (having four columns, TABLE_NAME, COLUMN_NAME, COLUMN_NO, and COLUMN_DESCRIPTION). Figure A-4 illustrates two queries to these tables: the first query will yield an alphabetized listing of all tables in the data base and the type of information each contains; after the table of interest has been determined, this second query is executed in order to obtain descriptions of the columns in this data base table (in this case the table SITE_LIST, in caps).

An example from a report created from the DIS data dictionary is shown in Figure 3-11. For a copy of the entire DIS data dictionary document, contact the DIS staff.

```
UFI>
UFI> LIST
  1  SELECT OBS_DATE,FROM_SITE,TO_SITE,DISTANCE,ERR,WEIGHTED_OBS,TOTAL_OBS
  2  FROM BASELINE_VLBIGSFC
  3  WHERE FROM_SITE = 'CHLBOLTN' OR TO_SITE = 'CHLBOLTN'
  4* ORDER BY OBS_DATE,FROM_SITE,TO_SITE
UFI> L3
  3* WHERE FROM_SITE = 'CHLBOLTN' OR TO_SITE = 'CHLBOLTN'
UFI> C/=.../LIKE 'K%'/
  3* WHERE FROM_SITE LIKE 'K%'
UFI> LIST
  1  SELECT OBS_DATE,FROM_SITE,TO_SITE,DISTANCE,ERR,WEIGHTED_OBS,TOTAL_OBS
  2  FROM BASELINE_VLBIGSFC
  3  WHERE FROM_SITE LIKE 'K%'
  4* ORDER BY OBS_DATE,FROM_SITE,TO_SITE
UFI> /

<RETURN> to continue
```

Obs. Date	From Site	To Site	Baseline Distance	Error	Weight Obs	Total Obs
24-JAN-84	KASHIMA	MOJAVE12	809182413.5	3.6	118	121
24-FEB-84	KASHIMA	MOJAVE12	809182411.4	1.9	121	129
07-JUL-84	KAUAI	KWAJAL26	372519632.1	1.2	77	233
07-JUL-84	KAUAI	MOJAVE12	430358123.2	0.8	227	238
07-JUL-84	KAUAI	VNDNBERG	397252457.2	1.1	27	146
07-JUL-84	KWAJAL26	MOJAVE12	757693864.8	1.6	37	225
07-JUL-84	KWAJAL26	VNDNBERG	729810843.9	1.9	1	23
21-JUL-84	KAUAI	KWAJAL26	372519626.1	1.5	38	127
21-JUL-84	KAUAI	MOJAVE12	430358118.4	0.8	115	136
21-JUL-84	KAUAI	VNDNBERG	397252452.3	0.9	65	133
21-JUL-84	KWAJAL26	MOJAVE12	757693854.9	1.9	23	122
21-JUL-84	KWAJAL26	VNDNBERG	729810834.0	2.0		
22-JUL-84	KAUAI	KWAJAL26	372519629.6	1.4	41	122
22-JUL-84	KAUAI	MOJAVE12	430358123.0	0.7	118	135
22-JUL-84	KAUAI	VNDNBERG	397252455.0	0.8	92	134
22-JUL-84	KWAJAL26	MOJAVE12	757693859.3	1.8	22	116
22-JUL-84	KWAJAL26	VNDNBERG	729810838.6	1.8	7	116
28-JUL-84	KASHIMA	KAUAI	570936048.7	2.1	96	100
28-JUL-84	KASHIMA	KWAJAL26	393633075.0	1.8	86	119
28-JUL-84	KASHIMA	MOJAVE12	809182414.2	2.8	72	85

```
<RETURN> to continue


99 records selected.

UFI>
```

Figure A-3. SQL Query Modification Example (Part II)

```
UFI> SELECT *
  2  FROM TABLE_INFO
  3* ORDER BY TABLE_NAME;

<RETURN> to continue
```

Table Name	Table Description
ANCILLARY_LLRTEXAS	Lunar laser ancillary information submitted by the University of Texas
APLOCATIONS_LLRJPL	A priori site locations from the LLR solution submitted by JPL
APLOCATIONS_VLBIGSFC	A priori site locations from the VLBI solution submitted by GSFC
APLOCATIONS_VLBIJPL	A priori site locations from the VLBI solution submitted by JPL
APSTAR_VLBIGSFC	A priori VLBI radio source coordinates from the solution submitted by GSFC
APSTAR_VLBIJPL	A priori VLBI radio source coordinate from the solution submitted by JPL
ATMOSPHERIC76_NGS	Effective atmosperic angular momentum functions supplied by NGS for 1976
ATMOSPHERIC77_NGS	Effective atmospheric angular momentum functions supplied by NGS for 1977
ATMOSPHERIC78_NGS	Effective atmospheric angular momentum functions supplied by NGS for 1978
ATMOSPHERIC79_NGS	Effective atmospheric angular momentum functions supplied by NGS for 1979
ATMOSPHERIC80_NGS	Effective atmospheric angular momentum functions supplied by NGS for 1980
ATMOSPHERIC81_NGS	Effective atmospheric angular momentum functions supplied by NGS for 1981
ATMOSPHERIC82_NGS	Effective atmospheric angular momentum functions supplied by NGS for 1982
ATMOSPHERIC83_NGS	Effective atmospheric angular momentum functions supplied by NGS for 1983
ATMOSPHERIC84_NGS	Effective atmospheric angular momentum functions supplied by NGS for 1984
ATMOSPHERIC85_NGS	Effective atmospheric angular momentum functions supplied by NGS for 1985
ATMOSPHERIC86_NGS	Effective atmospheric angular momentum functions supplied by NGS for 1986
BASELINE79_SLRGSFC	Baseline solution computed by GSFC from SLR data for 1979
BASELINE80_SLRGSFC	Baseline solution computed by GSFC from SLR data for 1980
BASELINE81_SLRGSFC	Baseline solution computed by GSFC from SLR data for 1981
BASELINE82_SLRGSFC	Baseline solution computed by GSFC from SLR data for 1982

```
<RETURN> to continue
```

```
<RETURN> to continue
```

Table Name	Table Description
TAB	List of all accessible tables in the DIS data base
TABLE_INFO	Descriptions of tables contained in the DIS data base
TAPE_INFO	DIS data tape information
UT1VALUESMCD_LLRJPL	UT1 solutions computed by JPL from McDonald lunar laser ranging data

```
173 records selected.

UFI> SELECT COLUMN_NO, COLUMN_NAME, COLUMN_DESCRIPTION
  2  FROM COLUMN_INFO
  3  WHERE TABLE_NAME='BASELINE79_SLRGSFC';

<RETURN> to continue
```

Col. No.	Column Name	Column Description
1	F_STATION	"From" station number
2	S_STATION	"To" station number
3	BASELINE	Baseline length (meters)
4	BASELINE_SIGMA	Sigma on baseline length (meters)
5	CHORD	Chord baseline length (meters)
6	CHORD_SIGMA	Sigma on chord baseline length (meters)
7	GEODESIC	Geodesic baseline length (meters)
8	GEODESIC_SIGMA	Sigma on geodesic baseline length (meters)

```
8 records selected.

UFI>
```

Figure A-4. DIS Data Dictionary Query Example

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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
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15. Supplementary Notes

16. Abstract

This document describes the contents of the Crustal Dynamics Project Data Information System (DIS) and instructions on the use of this facility. The main purpose of the DIS is to store all geodetic data products acquired by the Project in a central data bank and to maintain information about the archive of all Project-related data. Access and use of the DIS menu-driven system is described as well as procedures for contacting DIS staff and submitting data requests.

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